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## AN ANALYSIS OF FIFTY-ONE CASES OF PNEUMOTHORAX.

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*Frequency.* During the eighteen years from 1882 to 1899, inclusive, the diagnosis of pneumothorax appears sixty-four times in the medical records of the Boston City Hospital. In thirteen, however, the data are not sufficient to confirm the diagnosis, so that but fifty-one are available for study.

*Etiology.* Seven, or 14 per cent., were certainly not tubercular. In 8, or 16 per cent., no cause for the pneumothorax could be made out. As the conditions, besides tuberculosis, causing pneumothorax are usually evident, and as pneumothorax may occur early in the course of tuberculosis and before the development of other well-marked symptoms, it is probable that these cases were also tubercular. They will, therefore, be classified as such. In the remaining 36, or 70 per cent., there can be little or no doubt as to the tubercular origin. Unfortunately, autopsies were obtained in but few cases, and routine examinations of the sputum for tubercle bacilli were not the custom in the earlier years. The diagnosis of tuberculosis was proved by autopsy in 13 cases, and by the demonstration of tubercle bacilli in the sputum in 2 more. In the others it rests on the presence of the physical signs of tuberculosis in the other lung and histories typical of pulmonary tuberculosis. Physical signs were present in all but 3 cases. The proportion

[1] Read at a meeting of the Clinical Section of the Suffolk District Medical Society, February 21, 1900.

of tubercular cases was therefore 86 per cent., or, omitting the cases open to some doubt, 70 per cent. These figures correspond very closely to those obtained in other series of cases.

NON-TUBERCULAR CASES. One of these was due to trauma, and in one the cause was undetermined, except that the fluid gave a pure culture of streptococci. Four followed pneumonia and abscess of the lung, and one gangrene of the lung.

*Trauma.* This case was due to a stab with a pen-knife. It was open, purulent, and was treated by excision, irrigation, and drainage. Recovery was complete four months after operation.

*Unknown Cause.* The pneumothorax was present when first seen, five weeks after the beginning of some acute illness. The onset of the pneumothorax was insidious. It was open and purulent. Excision was followed by death on the same day. Smears and cultures showed streptococci and no tubercle bacilli. There were no tubercle bacilli in the sputum.

*Pneumonia and Abscess of the Lung.* The onset gave no symptoms in any. The physical signs of pneumothorax were discovered on the seventh, fourteenth, and twenty-sixth day after the beginning of the pneumonia. All were open and purulent. One was not operated on, and died on the fourth day after the onset of the pneumothorax. Excision was done in three, and all recovered.

*Gangrene of the Lung.* The pneumothorax came on acutely one month after the beginning of an acute illness following immersion. There was no operation, and death occurred on the fourth day of the pneumothorax. The pneumothorax was open. Autopsy showed gangrene of the lung and perforation, but no evidences of tuberculosis.

*Conclusions.* These cases are too few to warrant any definite conclusions. It does seem evident, however, that when the pneumothorax is secondary to non-tubercular pulmonary diseases it is likely to remain open, and is always purulent. The results of excision of the ribs when it is due to the perforation of a pulmonary abscess are very encouraging. The onset in these cases is very often unnoticed, probably because of the serious condition of the patient as the result of the primary disease.

TUBERCULAR CASES. *Heredity.* There was a well-marked tubercular history in 13, or 30 per cent. No history was obtained in 8. It was good in 23, or 52 per cent.

*Sex.* Thirty-seven were men and 7 women. This preponderance of the male sex has been the rule in other series.

*Age.* The average age in 36 men was twenty-eight years, and in 7 women twenty-six years. The youngest man was seventeen, the oldest fifty-eight. The youngest woman was nineteen, the oldest forty-four. Twenty-three, or 53 per cent., were in the third decade. This frequency in the third decade has been noted in other series, and is prob-

ably explained by the fact that the mortality of tuberculosis is greatest at this period. Four men and one woman were over forty, the respective ages being fifty-eight, fifty-six, forty-four, forty-one, and forty-four. This is an unusual proportion of older people, as the condition is said to be very uncommon over forty.

*Location.* The pneumothorax was on the right side in 15 cases, and on the left in 29. Both sides were never involved. This preponderance of the left side has been observed in most series of cases. Some of the explanations given for this preponderance are that the left lung is more often tubercular than the right, and that the greater mobility of the anterior border of the left lung, because of its position over the heart, renders the formation of adhesions difficult, and hence predisposes to perforation. Neither of these explanations seems very satisfactory, however.

*Onset.* The onset of the pneumothorax was accompanied by acute symptoms in 17, or 44 per cent., of the 39 cases in which there were any data. In the remaining 22 the onset was insidious.

In one case with well-defined onset it came on after a hard fit of coughing, in another while anchoring in a tug of war, and in another as the result of being thrown while wrestling. In one case it was especially noted that he collapsed without cause, in another that he was quiet at the time, and in another that there was no exertion or cough. Another woke up in the night with pain and dyspnœa.

The symptoms of the onset in 11 cases were *sudden* pain with dyspnœa or orthopnœa. In 4 cases there was sudden dyspnœa or orthopnœa without pain. Two cases were ushered in with pain, but did not have dyspnœa for some hours. Collapse was noted in 1 case, a chill in 1, vomiting in another, and sudden "weakness" in 2.

The pneumothorax came on insidiously in 7 of the cases while they were in the hospital. There was no increase in the symptoms, and the presence of the pneumothorax was not suspected, being in all cases discovered in the routine examination of the chest. Two were under treatment for pulmonary tuberculosis. Four had pleurisy with serous and 2 with purulent effusion. All had been tapped before the occurrence of the pneumothorax. Owing to the insidious onset it is impossible to state what connection, if any, there was between the tapping and the pneumothorax.

The onset of the pneumothorax was the first symptom of disease in 4 cases. Other symptoms, more or less marked, of pulmonary disease preceded the pneumothorax in 35 others. The duration of these symptoms varied from a month to four years; the average was a little more than eight months.

*Physical Signs.* The hospital records were, as a rule, so incomplete that it was impossible to draw any very definite conclusions from them.

In the 38 cases in which there was fluid as well as air in the pleural cavity succussion was noted in 24, and a metallic tinkle in 17. It is probable that both were present, although not noted in most if not all of the others.

The physical signs pointed to an open pneumothorax in 16 cases, to a closed one in 18 cases, and to a valvular one in 5 cases. No conclusions could be drawn in the others.

As would be expected, the displacement of the heart and liver in the closed and valvular cases was somewhat greater than in the open, and was greater in the left-sided cases than in the right. The heart was displaced in every case but one. Firm pericardial and pleuro-pericardial adhesions accounted for the absence of displacement in this case. The data do not warrant any more definite conclusions.

In 10 of the cases the physical signs of expanded lung were present at the apex on the affected side. The explanation, as proved by autopsy in 4 cases, is undoubtedly the adherence of the pleural layers. Fluoroscopic examination in another case showed the lung expanded at the apex above the air and fluid.

In 6 of the cases there was no fluid in the pleural cavity. In 5 with fluid there were no data as to its character. In 14 it was serous, and in 19 purulent. That it may remain serous is proved by two cases in which it was unchanged after six and nine months.

*Mortality.* Seven of the 43 cases in which the data were satisfactory recovered from the pneumothorax—*i. e.*, 16 per cent. The duration of the pneumothorax in these cases was three weeks in 1, four weeks in 1, five weeks in 1, six weeks in 3, and four months in 1. Physical examination showed complete expansion of the lung in 1 case four weeks, and in another five weeks after the onset. Autopsies, in one case after two months and in another after five months, showed complete expansion of the lung with the layers of the pleura adherent throughout their whole extent. It is probable that this is the condition in most of the cases which recover. Two died in three months, 1 in eight months, and 1 in four years. One was alive at the end of six weeks, another at the end of nine months, and a third at the end of ten months, when they passed from observation. It is evident, therefore, that even in cases which recover from pneumothorax death is likely to ensue early as the result of the causative conditions.

The pneumothorax is known to have continued until death in 27 cases. In 24 of them death occurred at intervals of from two days to four months after the onset, 9 being in the first two weeks. Two lived eighteen months, and 1 died as the result of an Estlander operation seven years later, the pneumothorax having persisted. The fatal termination in this case can hardly be attributed to the pneumothorax.

Nine cases passed from under observation at intervals of from two

days to two months after the onset of the pneumothorax. Two of these died in two months, 1 after eighteen months, 1 after twenty-one months, 1 after three years, 1 after five years, 1 after eight years, and 1 after eleven years. One was lost sight of, and the other is known to be alive after eight months. The death of the first two can certainly be attributed to the pneumothorax.

Twenty-six, or 60 per cent., of 43 cases died, therefore, directly as the result of the pneumothorax. One is still alive, and 6 probably died as the result of the causative processes rather than of the pneumothorax. This percentage of direct mortality is rather lower than that of most observers. Thirty, or 79 per cent., of the 38 cases in which the data are complete died in less than a year, and only 4, or 10 per cent., were alive after five years. Death was sudden in four instances. This liability to sudden death should always be remembered in the prognosis of these cases.

All the cases that recovered and all that passed from observation alive were left-sided. Of those in which the pneumothorax persisted until death 15 were right-sided and 12 left-sided. Left-sided pneumothorax was less fatal, therefore, than right-sided. It is very possible, however, that this difference is purely accidental.

Six of the seven women died in the hospital, the other three months after leaving it. The condition seems, therefore, to be more fatal in women than in men. This has been the case in other series.

*Pathological Lesions.* Cavities were found in 8 of 10 autopsies in which the point was noted. In 6 the cavity was at the apex of the lung, in 1 in the lower lobe. The perforation was found in 6, and was, as a rule, very small. In 3 cases a piece of fibrin acted as a valve.

It seems worth while to compare the course and ultimate results of the cases in which the pneumothorax remained uncomplicated with those in the cases in which serum or pus was also present.

*Air Cases.* There were 6 of these cases; 5 died in a week or less. The other showed no fluid at the end of a month. It died in twenty-one months. The absence of fluid in the 5 cases that died in the first week may be accounted for by the early death, fluid not having had time to accumulate. It is possible that the other case may have always remained gaseous, as it was so at the end of a month. It is more probable that fluid formed later. Several cases have been reported, however, in which liquid never appeared and which recovered rapidly. Such cases must be very rare, however, as the absence of exudation means a normal pleura, which is unusual in tubercular cases. If the pleura is normal and the lung but little diseased, there seems no reason why they should not run a favorable course as do cases due to external causes or rupture from violence.

*Serous Cases.* There were 14 of these cases. Six of them were among the cases in which the pneumothorax was recovered from. It is prob-

able that some of the others became purulent after they passed from observation. One was still serous at the end of eight months, however, and another at the end of nine months.

Six, or 43 per cent., died in the first three months. Three passed from observation at the end of six weeks, nine months and ten months. One is still alive at the end of 8 months. One lived eight months; 1, four years; 1, eight years; and 1, eleven years.

The proportion of cases in this series which recovered from the pneumothorax is unusually large, but few cases having been reported.

*Purulent Cases.* There were 19 purulent cases. The pneumothorax disappeared in only one of them. The lung did not expand, however, and the empyema increased. Death took place at the end of two months.

Twelve, or 63 per cent., died in the first three months; 1 lived four months; 1, five months; 3, eighteen months; 1, five years; and 1, seven years.

Four cases were operated on. Two died three weeks after excision; 1 lived eighteen months after an excision. The sinus remained open until death. Another lived seven years after an incision, followed later by an excision. The sinus remained open and the lung did not expand. He died about a week after an Estlander operation. Although surgical interference did not give very favorable results in these cases, yet it is noticeable that the case that lived longest was operative. He would undoubtedly have lived longer had it not been for the last operation. Another of the longer cases was also operative. The results under medical treatment were certainly no better, if as good. There was, moreover, no evident tendency toward closure of the perforation and expansion of the lung under expectant treatment. Hence in cases in which the pulmonary lesions are not too far advanced surgical intervention along the same lines and under the same conditions as in tubercular empyema seems indicated.

*Comparison of Serous and Purulent Cases.* Comparing the serous and purulent cases it is evident that the prognosis both as to recovery from the pneumothorax and as to duration of life is much more favorable in the serous cases. Recovery from the pneumothorax occurred in 6 of the serous cases and in only one of the purulent. There was no absorption of the fluid in this case, while in the serous cases the fluid also disappeared. Moreover, only 43 per cent. of the serous cases died in the first three months to 63 per cent. of the others. The duration of life in those that lived more than three months was so variable in both classes that comparison is impossible.

*Subjective Symptoms.* A very noticeable thing in the histories of these cases was the great difference in the subjective symptoms under apparently similar conditions. Many of the cases had marked dyspnœa or

orthopnœa and were extremely uncomfortable, while others were up and about the ward within two or three weeks of the onset, with their chests full of air and fluid. One man was able to "bundle wood" without much discomfort after five months.

*Conclusions.* Pneumothorax is an uncommon condition. At least 70 per cent., and probably 85 per cent., of the cases of pneumothorax are tubercular. The prognosis is good when it is due to trauma. It is fair when the pneumothorax is secondary to abscess of the lung. The results of excision of the ribs in these cases are very encouraging. Tubercular pneumothorax is much more common in men than in women. It is most frequent in the third decade. It is about twice as frequent on the left as on the right side. The onset is acute in rather less than half the cases. Sudden pain with dyspnœa are the most common initial symptoms. The pneumothorax may be the first symptom of tuberculosis noted. Displacement of the heart always occurs, being more marked in the left-sided cases. The pneumothorax is usually complicated by the presence of fluid, but may be simple. Air is rarely present alone in cases living more than a week. The fluid is more often purulent than serous. Recovery from the pneumothorax may occur in about 15 per cent. of all cases. The cases which recover are practically all serous. They usually die later, however, from pulmonary tuberculosis. The pneumothorax is the direct cause of death in 60 per cent. Eighty per cent. of all cases die in less than a year, and only 10 per cent. live over five years. The prognosis is worse in right-sided than in left-sided and in purulent than in serous pneumothorax. It is worse in women than in men. Surgical intervention is at least worthy of consideration in the purulent cases. Patients with pneumothorax are sometimes able to be up and about and even to do manual labor.

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## THE ACUTE PNEUMONIC FORM OF TUBERCULOSIS.

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The gelatinous tuberculous infiltration was first described by Laennec. He did not, however, recognize its marked resemblance to acute lobar pneumonia.

Louis saw cases of acute pneumonic phthisis, but considered them to be cases of tuberculosis complicated with genuine croupous pneumonia.

Andral[1] believed that tuberculosis, in some cases, followed pneumonia, taking its origin from some tuberculous focus in the lung, while in other cases the pneumonia in a lung previously sound and healthy was fol-

lowed by tuberculosis; but that in each case the pneumonia was at first of a genuine croupous character.

Stokes[2] divided acute tuberculosis into three groups:

1. A form characterized by a diffuse bronchitis with dyspnœa, cyanosis, high fever, and a typhoid state; a form identical with acute miliary tuberculosis.

2. A form resembling pneumonia and characterized by diffuse crepitant râles, corresponding to the acute caseous pneumonia.

3. The hæmoptic form; a more circumscribed form of acute tuberculous bronchopneumonia.

In the first and second forms the course is rapid and without signs of ulceration. In the third form the course is slower and ulceration may appear.

Traube[3] was the first German writer to describe the acute pneumonic form of tuberculosis, and in his first publication on this subject he called attention to the green sputum seen in these cases. It closely resembled pneumonic sputum, except that it was of a more greenish hue.

In a later article Traube[4] distinguished two general types of sputum seen in acute pneumonic phthisis. In the one it was reddish, yellow, or green, while in the other it was decidedly bloody, and the latter form usually appeared earlier in the disease. He laid especial emphasis upon the fact that the disease but seldom begins with a chill.

Hager[5] has given an excellent description of the condition, and he remarks that an acute miliary tuberculosis complicated with acute, lobular, desquamative pneumonia can be easily mistaken for croupous pneumonia. Hager believes that the pneumonia is not due to the local irritation of the tubercles, but represents an acute inflammatory process which like the tubercles is caused by the tuberculous poison.

Riel has reported fifteen cases of acute pneumonic phthisis, part of them collected from the literature. Twelve were adult men, two were women, and one was a child.

Frankel and Troje[7] report thirteen cases, all in men. In more than half of these cases reported by Frankel and Troje, neither the shape of the thorax nor the condition of nutrition indicated in the least the existence of a tuberculous lung affection; on the contrary, many of the subjects were robust, hard-working men, and some had never been ill before. Only three of the thirteen were addicted to alcohol. Only one had an hereditary history of tuberculosis, and one had had a resection of an elbow-joint several years previously. In eleven cases the age was between twenty and forty years. One patient was fifty-three years of age and one was seventy-two years of age. All observers are agreed that in contradistinction to true croupous pneumonia the disease seldom begins with a chill, but the onset is of a more insidious character.

When chilly feelings occur at the onset they are of a recurrent character. Four of the thirteen cases reported by Frankel and Troje began acutely with a chill. In the majority of the cases the fever was of a more or less pronounced remittent character; at times even of an intermittent type, with normal or subnormal morning and high evening temperature. This peculiarity of the temperature-range is a most significant feature of the disease. Two of the thirteen cases had well-marked herpes labialis. The pulse ranged from 100 to 140. The absence of cyanosis and dyspnœa were notable features in all the cases. The physical signs in the cases reported by Frankel and Troje were those of infiltration of an entire lobe or the greater part of a lobe, and resembled those noted in a lung just past the crisis or resolving in croupous pneumonia. In addition to loud tubular breathing, widespread crepitant, subcrepitant, and small moist râles were heard. The infiltration usually involved the posterior portion of one lung, sometimes the lower lobes alone. This was probably due to the fact that one had to do with an aspiration pneumonia. Usually only one lung was affected, and that was the one which contained the old focus. Frankel and Troje state that though the tuberculous process almost invariably takes its origin from an old focus of tuberculosis it is only in a very small number of cases that this focus can be demonstrated *intra vitam*.

These authors also lay especial emphasis upon the fact that there are frequent changes in the percussion note and the auscultatory signs. These changes seem to occur both in the cases which recover as well as in those which go on to a fatal termination. The sputum in many cases does not differ from that of ordinary croupous pneumonia. The typical rusty sputum, glairy, ropy, and transparent, naturally points to a croupous pneumonia unless, perchance, it should have a greenish tinge. Nine of the thirteen cases reported by Frankel and Troje had typical pneumonic sputum; five of these cases showed the greenish tinge described by Traube, while in four cases the sputum was typically rusty. As a rule, the pneumonic sputum lasted several weeks and gradually became of a mucopurulent character, which often showed a greenish tinge. In two cases there was hæmoptysis at the onset. In six cases tubercle bacilli were found in considerable number. In two cases the number of tubercle bacilli varied, sometimes they were very numerous, while at other times none could be demonstrated. In three cases the tubercle bacilli were not found ante-mortem, although a centrifuge was used. The earliest demonstration of the tubercle bacilli was eleven days after the onset. The inconstancy of the demonstration of the bacilli is explained by the fact that the bacilli are found in numbers only when there is softening of the lung tissue, or when the old focus from which the process took its origin is of such a character that secretion containing bacilli is poured out into the air-passages.

Liver enlargement was not noted in any of the cases, and in only two cases was the spleen enlarged. The nervous system was but slightly involved, occasional delirium of exhaustion being seen.

Albumin in the urine was rare.

Frankel and Troje consider the important diagnostic points to be as follows:

1. Absence of a crisis at the time when the auscultatory signs indicate a resolving pneumonia. The temperature may show more or less marked variations, and may at times be of the typus inversus—that is, morning temperature higher than the evening.

2. Absence of dyspnœa and cyanosis with rather rapidly increasing pallor of face and mucous membranes.

3. Greenish color of sputum and presence of tubercle bacilli in it.

4. Presence of diazo reaction in the urine from the onset.

5. Rapid emaciation and loss of strength.

Eleven of the thirteen cases reported by Frankel and Troje died.

Of the twelve cases reported by Israel[8] only three died.

Of the fifteen cases collected by Riel from the literature fourteen died.

The average duration of the cases reported by Riel was seven weeks.

In the cases reported by Frankel and Troje the minimum duration of a fatal case was twelve days, and the maximum ninety-two days, the average being about six weeks.

From their own observations Frankel and Troje conclude that the anatomical condition in acute pneumonic phthisis is that of a diffuse infiltration involving an area composed of numerous lobules, a whole lobe or even several lobes. The involved area is of a grayish-red or gray color, and the cut surface is smooth or granular. Usually the infiltrated tissue is completely airless, but sometimes in the early stages one sees a few air-containing alveoli. In the uniformly consolidated areas one often finds yellow, opaque masses of caseation which may vary greatly in form and size, at times so extensive as to occupy several lobules or the greater part of a lobe. The appearance not infrequently resembles that of Roquefort cheese. Areas of softening are rare, and when cavities are formed the walls are not indurated.

The constant fashion in which the histological findings in the diffuse gelatinous infiltration differ from those seen in areas of tuberculous proliferation of tissue lead Frankel and Troje to assume that the diffuse gelatinous infiltration is not the direct result of the action of the tubercle bacilli, but of their diffusible chemical products.

These authors have performed a series of experiments upon rabbits in which they made intratracheal injections of cultures of tubercle bacilli and succeeded in producing a gelatinous pneumonia, without the presence of any other micro-organisms than tubercle bacilli.

This view, that the inflammation may be in great part due to the toxins, is strengthened by the observation that the infiltration in some cases resolves, which would not be expected if the tubercle bacilli were present in any number.

Frankel and Troje state that the areas of caseation are always surrounded by a zone of epithelioid tissue, and they assume that caseation occurs only in this epitheloid tissue and not in the exudative contents of the alveoli.

In this zone of epithelioid tissue as well as in the periphery of caseous masses one usually finds tubercle bacilli. The epithelioid growth takes its origin from the alveolar walls, and the growth is usually intra-alveolar, in contradistinction to the condition in miliary tuberculosis where the tubercles usually develop interalveolarly. The principal feature of the gelatinous infiltration is an exudative inflammatory process with marked proliferation of the alveolar epithelium and desquamation of the same.

In the service of Dr. Osler at the Johns Hopkins Hospital there occurred a case of acute pneumonic tuberculosis in which the diagnosis was confirmed at autopsy. So many interesting features of the disease were illustrated by this case that it was thought best to report both the clinical and pathological notes somewhat in detail.

E. H., female, married, aged thirty-eight years. Admitted August 16, 1898; died September 21, 1898.

*Complaint.* "Stomach trouble."

*Family History.* Good. No tuberculosis, cancer, or heart disease.

*Personal History.* Usual diseases of childhood. Malaria off and on for the past eighteen years, usually in the fall, at times followed by more or less of malarial cachexia.

*Present illness* dated from May, 1897. Pain in the region of the stomach after eating. No nausea or vomiting at first. Since April, 1898, stomach symptoms have been more aggravated, associated with nausea and vomiting. Slight hæmatemesis at times. No cough or shortness of breath. Has lost thirty-four pounds in weight during the past year.

*Physical Examination.* A somewhat emaciated woman; dorsal decubitus; comfortable. Skin dark and sallow, slightly pigmented; lips and mucous membrane somewhat pale; pupils moderately dilated, equal, react to light and accommodation; tongue pale, slight moist white coat; pulse 76 to the minute, regular in rate and rhythm, moderate tension and small volume; artery can be rolled under finger.

*Thorax* well formed and symmetrical. Right clavicle a trifle more prominent than the left. Costal angle about 90°. Expansion slightly greater on the right than on the left side. Vocal fremitus felt on both sides, more plainly on the right. The percussion note clear and resonant throughout both fronts and axillæ. On auscultation breath sounds clear and of normal relative intensity, no râles or adventitious sounds.

*Backs.* Vocal fremitus felt on both sides, more plainly on the right. Percussion-note clear and resonant throughout both backs. On auscul-

tation breath sounds clear and of normal relative intensity; no râles or adventitious sounds.

*Heart.* Negative.

*Abdomen.* Liver dulness not increased. Spleen just palpable at costal margin on deep inspiration. Right kidney palpable. No glandular enlargement. No swelling of feet or ankles. Urine examination negative.

*August 17th.* Stomach inflated; lower margin extends to the level of the umbilicus; greatest extent of stomach tympany 24 cm.; no peristaltic waves; no mass felt.

Vaginal examination negative.

At 10 P.M. stomach washed; small amount of partly digested food; fluid faintly blood-tinged.

*18th. Test-breakfast.* Slice of bread, water four ounces, removed after one hour; 25 c.cm. obtained; partly digested food, no blood, sour odor, acid to litmus, no free hydrochloric acid. Suggestive reaction for lactic acid with Uffelmann's test. Total acidity: 1.4 c.cm. of decinormal sodium hydrate solution required to neutralize 10 c.cm. of filtered gastric juice. Rennin present; pepsin present. As a result of this examination the possibility of carcinoma of the stomach was considered. Temperature since admissio n98° to 100°. Patient has seemed to be doing well.

*23d.* No pain, no cough, no chill, simply general malaise. Dulness in right back at extreme base. Superficial dry friction rub, heard all over the lower right back, while at the base respiration has a distinctly tubular character. The tubular respiration does not extend above the angle of the scapula nor forward of the scapular line. Temperature to-day ranged from 99° to 100.8°. Leucocytes 6000 per cubic millimetre. Fresh blood examination negative. Urine examination negative.

*25th.* Area of dulness and tubular breathing in right back seems to have increased; extends now to midway between the angle and spine of the scapula. Few superficial crackles heard at the end of deep inspiration. Area of dulness does not extend anteriorly beyond posterior axillary line. Right front and axilla and left lung clear on percussion and auscultation. Small amount of rusty sputum. Slight cough, no dyspnœa, no cyanosis. Respirations 18 to 24 per minute. Temperature for the past two days has ranged from 99.6° to 101.4°. Leucocytes 6100 per cubic millimetre.

*27th.* Dulness below spine of scapula inside of mid-scapular line. Respiration blowing and tubular, not very intense. Fine crepitant râles are much less numerous than previously. For the past two days the temperature has ranged from 102.2° to 103.8°. Respiration 24 to 30. No cyanosis. Patient weaker. Small amount of rusty sputum. Leucocytes 5200 per cubic millimetre.

*29th.* Patient dull and drowsy this morning. No respiratory distress, no cyanosis. Dulness extends to the spine of the scapula in the right back and as far as the sixth rib in the mid-axilla; does not pass anterior axillary line. Over this area tubular respiration is heard, especially intense in the lower right back. A few small moist râles on deep inspiration. Temperature has ranged from 100.2° to 104.8°. Respiration 24 to 28. Pulse 108 to 126 and rather weak. Leucocytes 5200 per cubic millimetre. Sputum fluid and typically rusty. After very careful examination a few typical tubercle bacilli were found in

the sputum associated with numerous streptococci and diplococci. No elastic tissue.

31*st*. Patient decidedly weaker. Pulmonary signs unchanged. Pulse small, 116 to the minute, low tension, and occasionally intermittent. Temperature still elevated, ranging from 99° to 104°. During the past twenty-four hours the patient has had several hæmoptyses of bright red blood from one to three ounces at a time. No respiratory or cardiac distress.

*September 5th*. Pulmonary condition has remained unchanged since last note. Temperature has ranged from 102° to 104°. Pulse weak. No cyanosis, no respiratory distress. Some cough. Expectoration not very profuse, bloody. Patient seems to be growing weaker. Slight abdominal distention.

13*th*. Patient very weak. Temperature ranging from 100° to 103.8°. Respiration 20 to 28. Over right axilla note is almost tympanitic in quality; duller over the back. Breath sounds tubular, almost amphoric. Occasional râle on expiration. Right front clear. A few scattered fine râles heard over the left side. Examination unsatisfactory because of very weak condition of the patient. Leucocytes 3400 per cubic millimetre. Repeated sputum examinations have on each occasion shown a few typical tubercle bacilli. No elastic tissue demonstrated.

21*st*. Patient has gradually grown weaker. Temperature has still remained elevated. Slightly delirious at times. No respiratory distress. Physical examination not attempted. Death was quiet, at 10.15 P.M. on the thirtieth day of the disease.

*Pathological Report*. E. H. Autopsy September 22, 1898, 11 A.M., thirteen hours after death. Heart and pericardial cavity negative.

*Notes on Lungs*. Dr. Osler. Right lung: old, very tough adhesions over posterior part of upper lobe and lateral and anterior surface of upper lobe. Lower and middle lobe free. Puckered depression at lateral surface of upper lobe in the same situation as the adhesions. The lung is voluminous, does not collapse. Pleura generally smooth, a little turbidity and fresh exudate over lower lobe. Color dark red except in antero-lateral margin. Upper lobe is crepitant at apex and anterior half. Middle lobe is crepitant throughout. Lower lobe universally solid.

On section upper lobe presents about its centre and corresponding to puckered area an old fibroid patch surrounding a small cavity the size of a cherry; this is in direct communication with a bronchus. The tissue outside the slaty induration is in a condition of gelatinous infiltration, and it presents also scattered small tubercles. Posterior and lower part of upper lobe is solid, and on section is seen to contain numerous groups of tubercles with solidified intervening tissue. The middle lobe is crepitant throughout, œdematous toward the root, and presents a few scattered fresh tubercles. The lower lobe is firm and airless. It feels just like a lung of red hepatization. On section uniform brownish-red in color and granular. On fresh section dry; scrapings are hemorrhagic. The reddish granular appearance with solidification gives a picture almost identical with that of ordinary pneumonia. On examination with lens it is seen that the consolidation is due to innumerable miliary granulations which are in places densely packed together; in others loosely, and with a good deal of intervening, deeply congested

lung tissue. On section there are areas a little lower, indicating where there is a lower level comparatively free from tubercles. Nowhere on section are there areas showing any trace of caseation. This picture is present uniformly throughout the lower lobe. The left lung is crepitant at the apex. The lower lobe is infiltrated, only slightly crepitant. The greater part is solid. The pleura over the middle of the lung is rough, has a fresh fibrinous exudate, and a few hemorrhages. The upper lobe is much infiltrated with serum, and presents numerous areas of tuberculous bronchopneumonia and scattered groups of miliary tubercles. The apex is puckered and pigmented. The lower lobe: apex is in a condition of gelatinous infiltration. The greater part of the lobe is solid. It presents on section groups of tubercles not so closely aggregated as in the other lung. The intervening tissue is deeply congested, airless, infiltrated; sufficient to cause portions to sink. Nowhere are there any large caseous areas.

*Spleen.* Weight, 240 grammes, 12 x 7 x 3 cm. Capsule is smooth, bluish-red, and semi-translucent. On section consistency somewhat diminished. The spleen pulp is deep red and soft. Malpighian bodies fairly well shown.

*Liver.* Weight, 1470 grammes; 21 cm. broad, 18 cm. long, 8 cm. thick. Capsule generally translucent. Color of liver tissue rather pale; lobules well marked. On section epithelium cloudy, opaque, grayish-white; not in marked contrast except in a few areas where the color has a slight yellowish tinge.

*Gall-bladder.* Normal.

*Kidneys.* Combined weight, 240 grammes. Capsule quite opaque, grayish-white, strips readily, leaving a smooth, pale, pinkish-red surface with well injected bloodvessels. On section epithelium opaque, grayish-white, and somewhat swollen. Pyramids not in very marked contrast. The striæ are well shown.

*Adrenals* apparently normal.

*Intestines.* The cæcum is very hemorrhagic and congested. The follicles slightly enlarged. This appearance extends also for a short distance into the ileum. The duodenum is tremendously injected and very hemorrhagic.

*Stomach* contains about 100 c.cm. of sour-smelling yellowish fluid with flakes of casein, and has lost nearly all its mucous membrane, which is found adherent in strips. This doubtless is a post-mortem change. There are, however, one or two areas where the innermost lining is opaque, white, tough, and granular looking. The organ is quite dilated; many of the vessels deeply injected.

*Genitalia* normal.

*Bladder.* Walls much injected over the lower and lateral portions. Ureteral orifices patent, prominent, and pale.

*Bacteriological Examination.* Lungs, micrococcus lanceolatus; kidney, bacillus pyocaneus.

*Anatomical Diagnosis.* Acute pneumonic tuberculosis. Old tuberculous focus with small cavity in upper right lung. Fibrinous pleurisy. Chronic gastritis. Hemorrhagic duodenitis. Cloudy swelling of kidneys.

*Microscopical Appearances. Lung.* With the lower powers of the microscope one sees a fairly uniformly consolidated lung tissue. The exudate in places seems to be of a granular character and contains only a moderate number of cells, while in other places the cellular element

seems to predominate. In still other portions of the section one sees more or less extensive areas of necrosis with caseation. The alveolar walls are plainly to be made out in all parts of the section, except where the necrosis and caseation are extensive.

On examination of the sections of the lung with the higher powers of the microscope many of the alveoli are seen to be occupied with plugs of granular and fibrillated fibrin. In this fibrinous meshwork one sees rather numerous shadows of red blood-corpuscles, together with a few swollen, desquamated alveolar cells, and an occasional mononuclear or polymorphonuclear leucocyte. In other places the fibrinous element seems to play a more subordinate rôle, while the desquamated alveolar cells form the principal element in the exudate. Nowhere, however, are there a great number of leucocytes to be seen in the exudate, and most of those present are of the mononuclear type with comparatively few of the polymorphonuclear variety. Between the two extremes of granular and fibrillated exudate containing but few cells, and an exudate composed almost exclusively of cells, one finds all gradations, the relative proportion of the different cellular elements being practically the same. The desquamated alveolar epithelial cells are the most numerous, while next in point of number come the small mononuclear leucocytes, and. lastly, the polymorphonuclear leucocytes. The red blood-corpuscles appear to be more numerous in the early stages of the process. In some of the plugs of exudate occupying the alveoli one sees distinct epithelioid cells, without, however, any evidence of necrosis. In places there seems to be a proliferation of the cells of the alveolar walls. These proliferated cells are epithelioid in character, and tend to push their way into the plugs of exudate in an attempt, as it were, to organize the exudate. It is in these masses of epithelioid cells that necrosis and caseation seem to first occur. By a gradual extension of the growth of the epithelioid cells, together with more or less numerous small round cells, several neighboring alveoli or an entire lobule may come to be occupied by this new-formed tissue. At the oldest portion of the epithelioid growth necrosis and caseation are most marked. The outline of the alveolar walls appears to be preserved for some time, but is finally lost in the mass of necrosis and caseation, the bloodvessels in the meantime having become obliterated. The process of necrosis seems to begin with a fragmentation of the nuclei. This process gradually extends until an area composed of one or more alveoli comes to be occupied by a granular mass of detritus, taking a deep eosin stain and dotted with the fragmented nuclei. Surrounding such an area of granular detritus, one can usually make out a zone of small round cells, and surrounding this a fairly distinct zone of epithelioid cells. It is through the growth with subsequent necrosis and cascation of this epithelioid zone that the more or less extensive caseous masses come to be formed.

In portions of the section fairly numerous giant-cells can be seen, situated not infrequently at or near the centre of a mass of epithelioid growth. Nowhere is there any evidence of direct caseation of the exudate. The caseation appears to always take place in and follow the epithelioid proliferation.

The walls of the bronchi appear to be involved in the same tuberculous process; the lining epithelium is for the most part destroyed. The lumen of the bronchus can often be seen to be occupied by a mass

of epithelioid tissue in which necrosis and caseation are more or less marked.

The pleura is somewhat thickened and is covered with a granular necrotic material in which epithelioid cells and fragmented nuclei can be seen.

With the Weigert fibrin stain a considerable amount of fibrillated fibrin can be made out in the plugs of the exudate, especially in the early stages. The fibrin is practically absent from the areas of caseation, although it can be made out in the zone immediately surrounding the area of caseation.

Fairly numerous intracellular and extracellular cocci can be seen, many of them corresponding morphologically to the diplococcus of pneumonia.

In sections stained with carbol-fuchsin and decolorized in acid alcohol a few typical tubercle bacilli can be seen. These are generally found in the areas of necrosis and do not seem to have any definite arrangement in these areas. Occasionally a few tubercle bacilli can be seen in the plugs of exudate, and not associated with necrosis or caseation.

*Liver.* In addition to slight chronic passive congestion and fairly well-marked fatty infiltration, one sees numerous areas of focal necrosis of the liver cells. There appears to be nothing uniform or constant in the distribution of these focal necroses. At an early stage the focal necroses are composed of but a few liver cells in which the nuclei either do not stain at all or only very faintly. The cell protoplasm seems to have undergone a hyaline degeneration, staining very deeply in eosin. The cells often appear somewhat shrunken and are also often fragmented. The area of necrosis does not, at this stage, contain any small mononuclear or polymorphonuclear leucocytes, nor is there any evidence of a reaction on the part of the fixed tissue surrounding the area of necrosis.

At a somewhat more advanced stage one finds the area of necrosis more extensive in character and now a very few small mononuclear and polymorphonuclear leucocytes are seen scattered throughout the necrosed area. There is, however, no reaction on the part of the fixed tissue. In its most advanced stage the focal necrosis is composed of an area of hyaline degeneration of the liver cells, in which one finds fairly numerous leucocytes, chiefly of the polymorphonuclear variety. There are also a few cells of an epithelioid character, but no evidence of giant-cells. There is no evidence of thrombosis or plugging of the blood-vessels.

It was impossible to demonstrate tubercle bacilli in any of the areas of necrosis, though repeated attempts were made. Nor were any other bacteria found in the areas of necrosis.

*Spleen*, except for a slight increase in the number of red blood-corpuscles present, is normal.

*Kidney* shows fairly well-marked albuminous degeneration. The cells of the convoluted tubules are swollen, while in many places the cell outlines are lost. The nuclei in many of the cells do not stain at all, while in others they stain only faintly.

Aside from the pulmonic condition the most interesting pathological feature of this case is the occurrence of the focal necroses in the liver.

These were first described by Pilliet[8] in experimental tuberculosis of the guinea-pig. He describes the process as a coagulation necrosis, and thinks that there may be an associated interstitial hepatitis.

Kockel,[9] in experimental tuberculosis of the guinea-pig, has also described focal necroses, which he considered to be due to a plugging of the vessel. In these areas of necrosis he was able to demonstrate tubercle bacilli.

Leredde[10] has described focal necroses in the viscera in acute and subacute phthisis. These areas are invariably located about the central veins and no tubercle bacilli could be demonstrated.

Le Count[11] has described focal necroses in the liver, spleen, and lymphatic glands associated with tuberculosis. He was able to demonstrate the presence of tubercle bacilli in these areas of necrosis, and he believes them to be due to the action of the tubercle bacilli.

In our case it was impossible to demonstrate the presence of tubercle bacilli or any other bacteria in association with the focal necroses. We are, then, compelled to assume that these areas of necrosis were the result of the action of some toxin, and it would appear most probable that this toxin was one produced by the tubercle bacilli. It may, however, be objected that the presence of the pneumococcus in the lung would be sufficient to account for the focal necroses in the liver, since these have been described in association with pneumonia due to the pneumococcus. Against this may be urged the character of the focal necroses, which we have been able to study from an early stage to a somewhat advanced stage. In an advanced stage one finds numerous small round-cells and a few cells of a distinctly epithelioid character which might indicate that the focal necrosis could go on to the formation of a genuine and definite tubercle.

It is not unreasonable to assume that as a result of the action of the toxin of the tubercle bacilli there may be at first a necrosis of a few liver cells, followed later by an accumulation of small round-cells, and still later by a development of epithelioid cells, the process eventually assuming the form of a definite tubercle.

The acute pneumonic form of tuberculosis would appear to be of not infrequent occurrence, and in every case of lobar pneumonia the clinician should bear in mind the possibility of a tuberculous infection. Especially in all protracted cases of lobar pneumonia should one consider the possibility of an acute pneumonic tuberculosis. In all such cases repeated and careful examination of the sputum should be made, for only in this way can an early diagnosis of acute pneumonic tuberculosis be made.

The main clinical features of the disease are in brief:

1. Onset, very often without a definite chill, though a definite chill may occur.

2. Fever, often of an elevated, regular character, but very frequently of an irregular or remittent character, and practically always of a remittent character in the later stages.

3. Absence, usually, of marked dyspnœa and cyanosis.

4. Physical signs which indicate consolidation of a part of a lobe, a whole lobe, or more than one lobe.

5. Pain in the side, with cough and a sputum which is at first typically pneumonic, rusty, and glairy, but which at the end of a week or ten days may assume a greenish tinge and which will be found to contain tubercle bacilli. In the case reported tubercle bacilli were found seven days after the onset.

6. Absence, in some cases at least, of the leucocytosis, usually associated with acute lobar pneumonia.

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## SENILE BRONCHITIS.[1]

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To one conversant with the literature of medicine it appears somewhat singular that in the past so little attention has been paid to old age and its diseases, while a chair of pediatrics is now esteemed necessary in every well-ordered medical school. The graduate obtains his information concerning a most important period of life from cursory remarks bearing upon the subject made by various teachers as opportunity may, perchance, offer itself. Of systematic teaching or even of

[1] Read before the Buffalo Academy of Medicine, March 13, 1900.

exhaustive treatises upon the subject there are practically none. Yet those of us whose practice is limited to that of a physician-specialist, or, as we preferably term it, that of an internalist, find ourselves often embarrassed in the presence of some well-defined disease which in an elderly subject offers unusual symptoms and signs. While senescence and senility present a large field, any part of which might be profitably tilled, I shall call attention to a small but important portion, offering a few suggestions upon the subject of senile bronchitis. I have chosen this subject partly because of the difficulties and disappointments commonly met with in its treatment, and partly because it is so closely related to other pathological conditions in the respiratory system which is responsible for about one-third of all deaths occurring in the aged.

It is far from my purpose to occupy much time in reviewing the various theories of senility and death, for these would involve me in a discussion of a correlated mystery—life—and philosophical discussions, although attractive, are not necessary in a paper which aims to be practical; even a definition cannot now be firmly postulated. It matters not whether we agree with Cicero in his masterly *De Senectute*, that old age is a disease, and treat it and of it philosophically, or we follow Canstatt in *Die Krankheiten des Greisenalters*, of 1839, and speak of senile involution as a phase of life, and mingle, as he does, speculation and observed facts, or assent to Day in his *Diseases of Advanced Life*, of 1849, the source of much information and a mine of clinical experience, the fact remains we are dealing with ordinary phenomena of disease modified as to their manifestations by anatomical conditions peculiar to advanced life. I say "phenomena of disease" advisedly, because, while it is impossible to believe that *minus* functional activity may still further diminish and life become extinct, as the flame of a candle is extinguished as it is burnt out, yet this is the exception, and our dealings with old age rest on the assumption of its morbidity and the necessity for therapeutic interference. If old age may seem to be physiological, it is because there is certainly much truth in the saying of my old master Charcot in his *Les Maladies des Veillards*, of 1867, that the "textural changes which old age induces in the organism sometimes attain to such a point that the physiological and pathological states seem to mingle by an imperceptible transition and to be no longer sharply distinguishable," but pathological old age is markedly predominant. When does old age begin? Hippocrates said at seventy, so did Flourens; Canabis puts it at sixty-five; Reveillé-Parise, at fifty-five. That the saying of Cazalis, so often quoted, "one is of the age of his arteries," is not entirely applicable is evident from the fact that a diminution in the respiratory capacity, one of the first signs of senile involution, is present as early as thirty-five or thirty-six. Doubtless the presbyatric

physician, if I may be permitted to coin a term, will have his triumph in advancing the time at which senility begins, so that threescore years and ten may be relegated to the mists of tradition, and so may claim equal honor with the pediatrist who has so markedly diminished infantile mortality.

What, then, are the tissue changes of old age? They are (1) a pure atrophy of the constituent elements of the tissues; (2) a progressive infiltration into certain tissues of organic (fatty or albuminous) or mineral (calcareous) elements foreign to their normal condition; and (3) an exaggerated production of connective tissue. Practically, all of these changes are found in the contents of the chest of old subjects. Fatty degeneration of the interalveolar septa results in perforation, the capillary vessels, being thus deprived of their support, atrophy, and the blood-supply is diminished, from production of fibrous tissue, sclerosis results, calcareous degeneration of arteries is frequent, calcification of costal cartilages tends toward diminished expansibility of the chest, and this lack of mobility is enhanced by the diminished power of the muscles. Of the types of senile lung described by Hourman and Dechambre, in 1835, the second seems to me to be that of pulmonary œdema and the third of fibrosis, both manifestly dependent upon circulatory disturbances, and, therefore, secondary. Their first type is, however, worthy of our attention. "In muscular persons with a well-formed thorax, not much altered by the ravages of age, the lungs present little apparent difference from those of the adult, except in the altered position of the great interlobular fissure. The degree of this alteration corresponds with the extent of lateral flattening resulting in diminution of the transverse diameter of the chest. In the adult this fissure lies immediately beneath the upper lobe, and passes obliquely to the root of the lungs, so that on the right side the central lobe occupies exactly the middle part, and in the left side has the lower lobe immediately beneath it (the fissure). But in old age the fissure approximates to the vertical direction, so that one lobe in the left lung is directly in front and the other behind, and the middle lobe in the right lung projects downward, and the lower lobe becomes elevated behind it, so as to form the posterior fourth (or more) of the summit of the organ." The significance of this condition lies in the fact that a senile phenomena which is entirely apical may be seated in the lower lobe of either lung. The contour of the chest is quite characteristic—in its upper portion flattened at the side. The vertical diameter is shortened in consequence of the diminished height of the intervertebral cartilages, and as the anterior portion of these cartilages is more rapidly absorbed we have a forward curvature of the spinal column as a further cause tending, in conjunction with the others, to lessen the capacity of the chest. The intercostal spaces narrow until contiguous

ribs come into contact with each other, and may even unite. The costal cartilages calcify and the chondrosternal articulations may unite, thus rendering the chest immobile. These facts present great significance in both symptomatology and therapeutics, as will be seen later. When, in addition, anthracosis, bronchiectasis, and degenerations of bronchial mucous membrane are generally present, the explanation of rapidity of respiration is easy. Of senile pathological pulmonary conditions, four claim our particular attention: bronchorrhœa, bronchitis, pneumonia, and tuberculosis. The ready engrafting of bronchitis upon bronchorrhœa, and the great tendency of the former to become chronic, the easy extension of bronchitis into pneumonia, and the insidious course of tuberculosis in the aged and its unsuspected frequency, necessitates in a discussion of bronchitis an excursion into contiguous fields of investigation. However, this shall be as short as is possible.

The cough in the aged is so frequent and constant a symptom that even the patient comes to look upon it as a necessary evil, and to regard its presence with resignation if not complacency. The cyanotic, wheezing, expectorating old man, overclothed, hugging a warm corner, is a familiar picture. At times he seems to improve—he goes out with confidence--but a change in the direction of the wind, a variation in the thermometer, or an overcasting of the sun, and he seeks his corner again with precipitous haste. For all that his expectoration is generally mucus, yet the mucopurulent variety is not uncommon. His respiration and pulse-rate are accelerated, as in all individuals afflicted with senility, but the former far more than the latter. As for temperature, the axillary is generally normal, the rectal somewhat raised, probably more than the normal difference. The bronchorrhœa of the aged passes, by almost imperceptible steps, into active bronchitis so frequently that the physician is taken by surprise. Chilly sensations, general malaise, increase of cough, local pains, all may be wanting, and yet the rapidly increasing purulency of the sputa, the high rectal temperature, and the duskiness of the face proclaim that bronchitis is present. The respiratory rate may not be much above the normal (for the aged) unless the smaller tubes are invaded, forming the formerly called capillary variety. No auscultatory signs, beyond coarse and fine mucous râles, and occasional sibilant or sonorous râles, are found. In estimating the percussion-note the peculiar resonance developed over calcified costal cartilages and united articulations should be eliminated, as well as various shades of resonance over dilated bronchi. Senile pneumonia is equally insidious, but in this case thorough percussion will develop flatness, frequently at the apex, increased vocal resonance and fremitus, and a higher pitched inspiration confirm the suspicion raised by rapid respiration, marked prostration, and general apathy. To distinguish pulmonary tuberculosis in the aged from senile bronchitis is no easy matter

at times, for the former somewhat rarely leads to large cavity formation or extensive infiltration, but is noted for its chronicity and comparative mildness. Bacteriological investigation does not always show bacilli, and observation over some time is needed in case of failure of the microscope to establish the diagnosis. The diagnosis of senile pulmonary tuberculosis may be established only at the necropsy.

Senile bronchitis tends always to become chronic, because senility follows the same course. But whether acute or chronic it behooves us to afford the greatest possible relief to the patient. I do not say cure until it is shown that senility can be cured or even senescence arrested.

In treatment, symptomatically speaking, the amount of expectoration must be lessened. Here belladonna, which yields such brilliant results in childhood, generally fails. The true expectorants, as apomorphine or cocillaña, increase the amount so much that the distress of the patient is augmented, and the fixed chest and weakened musculature militate against the expulsion of the sputum, although it may be more liquid. The nauseating expectorants are liable to interfere with digestion, and for that reason are doubly objectionable. Of the drug remedies, I would place strychnine and ammonium carbonate in the first rank. In acute exacerbations of chronic bronchitis ammonium carbonate, in five or ten-grain doses, given in two or three ounces of milk, not only liquefies secretion, but also stimulates the heart, stimulates the bronchial muscles, and thus relieves venous congestion and dyspnœa. As a rule, its action is more energetic, as Fothergill pointed out many years ago, when the skin is moist. The only disadvantage is, that after a week or more it is apt to disarrange the stomach ; but that period is longer than most patients require its use. For chronic bronchitis and convalescence from the acute form, strychnine sulphate, in from one-fortieth to one-twentieth of a grain, every three to six hours, not only does quite as much as the ammonium salt, but, in addition, is a more powerful stimulant to the right heart, as was shown years ago. Contrary to what is generally supposed, it is not a vasomotor constrictor, and, therefore, does not increase the work of the heart. Besides, this drug improves nutrition by stimulating the spinal cord and peripheral nerves and the respiratory centre, aids digestion, and is, in a limited way, a gastric antiseptic. To disinfect the expectoration, creosote carbonate, in twenty-drop doses, given in two ounces of sherry, repeated every four hours until purulency disappears, is effective. Ordinary creosote should never be given to the aged, because of its irritant effect on the kidneys. With copious secretion and difficult expectoration this is the drug of choice, frequently preventing the low fever from absorption of putrid material, which so often occurs. In this connection I would most strongly condemn the use of opium, or any of its

alkaloids, which is directly responsible for either speedy death from asphyxia (simply drowning the patient in his own secretion), or more gradually in producing this absorption, to which allusion has been made. Opium relieves cough by rendering the patient unconscious of its cause, and lulls the physician into a feeling of false security.

Naturally, associated conditions as gout, cardiac or renal disease, should receive attention.

Of physical measures, massage yields the most brilliant results. Systematic general massage, especial attention being paid to the chest, will increase chest expansion, improve nutrition, and not only facilitate expectoration, but diminish its formation. A warm, dry atmosphere is essential. An artificially dry atmosphere can be obtained in the patient's own room by exposure of calcium chloride or strong sulphuric acid in shallow earthen receptacles. Dust, so common in our city houses, must be filtered out, else asthmatic symptoms will become severe. This can be done at the inlet of the warmed air, or by the wearing of a Robinson respirator. Inhalations of steam, benzoinated liquids and similar remedies have always been failures in my experience. Camphor as a tincture is, however, an exception. Wool should be worn next to the skin, and the feet should be kept warm. "Taking cold" can be avoided by vigorous cutaneous friction with the flesh brush, practised daily, and inunctions of vaseline to the back of the neck and soles of the feet. To avoid night asthmatic attacks, and chilling during them, hearty evening meals should be discouraged—a meat diet is preferable. Unless the patient is a habitual drinker, alcohol should be sparingly used, and my preference is for a good port. Quite essential is a free movement of the bowels, best obtained by increasing the strychnine and the occasional use of the pharmacopœial compound vegetable cathartic. As for muscular exercise, much depends upon the habits and the strength of the patient. If chilling can be avoided it should be encouraged.

In this somewhat hasty review of the salient points in the presentation of senile bronchitis I trust the important points will not be lost sight of, and they are these:

1. Careful diagnosis.
2. Use of strychnine and ammonium carbonate.
3. Prohibition of opium.
4. Systematic massage.
5. Improvement of the general health. By giving close attention to our patients suffering from a condition sufficiently common not to attract careful study, I am sure we can do much not only to preserve life, but also toward making the last days of these patients their best days, and delay their passage by smoothing their way toward the end which awaits all mortals.

# A CASE OF MULTIPLE NEURO-FIBROMATA OF THE ULNAR NERVE.[1]

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## Surgical Report by Dr. Keen.

B. L., a laborer from Northumberland, Pa., aged forty-seven years, first consulted me April 17, 1899. His father died of tuberculosis; mother, of unknown cause. Neither of them suffered from rheumatism. The patient has suffered for twenty years from rheumatism, especially in his knees. For many years past there have been some tender nodules in the palm of his left hand. He is doubtful whether they are made worse by bad weather. At first they were painful only when compressed in handling a spade, axe, or any other such tool, but gradually the pain became continuous and kept him awake many nights. It was often so severe that he could scarcely refrain from outcries when it darted through his hand. As he expressed it, "The jumping toothache wasn't in it compared to this pain."

In January, 1892, another surgeon removed two of these nodules. Stellate scars at each place mark the site of the wounds, which suppurated. No microscopical examination of the tumors seems to have been made. He has now nodules at the places marked *a* to *f*, Fig. 1. These existed at the time of the prior operation, but as they were not painful they were not removed. The one in the forearm, marked *a*, is painful only occasionally, when, by accident, pressure is applied to it. The others are all spontaneously painful.

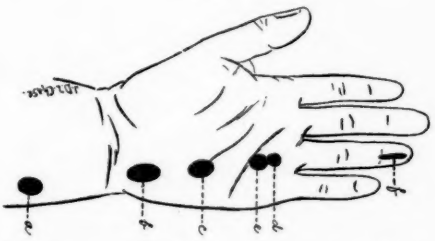
For twenty years also he has had a *fistula in ano*, for which two ineffectual operations have been done. Three openings about 3 cm. anterior to the anus, surrounded with a great deal of induration, were found.

*Operation, April* 18, 1899. I first made an incision above the wrist and exposed the ulnar nerve (at *a*, Fig. 1), in which I found a fusiform expansion, caused evidently by a mass in its interior. An incision made very carefully in the axis of the nerve enabled me to separate the fibres to each side, and with an Allis dissector to shell out from the interior of the nerve an oval tumor with a small filament 1 to 2 mm. in diameter at each pole of the tumor. It was quite a surprise to me to find so large a tumor, in view of its being so obscurely felt before operation. The same remark would hold true of all the others. A second incision was made at the eminence of the little finger (at *b*, Fig. 1), and a similar tumor again shelled out of the ulnar nerve. A third incision just above the web, between the ring and the little finger (at *d*, *e*, Fig. 1),

[1] Written for the Jacobi Festival volume. Read before the College of Physicians of Philadelphia, April 4, 1900.

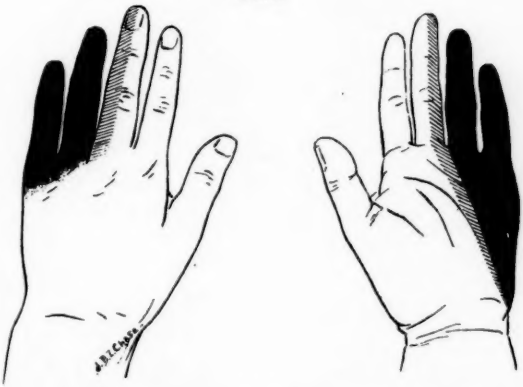
revealed two such tumors, and as I could now feel another tumor in the middle of the palm (*e*, Fig. 1), midway between the last two incisions, I made these incisions continuous and shelled out all the tumors. On

FIG. 1.



Showing position of the tumors. Compare this with Fig. 4.

FIG. 2.



Showing the condition of sensation in the left hand of B. L., April 18, 1899, just before operation. The black area shows hyperæsthesia for all qualities, excepting cold on the median side of ring finger. The parallel lines represent the hypæsthetic area. On the back of the middle finger the hypæsthesia was uncertain.

Sensation was tested for heat, cold, pain, and touch.

The ulnar side of the left hand was *hyper*sensitive for all qualities except on the median side of the ring finger; here cold was not perceived quite so distinctly as in the corresponding portion of the right hand. The median side of the ring finger, palmar aspect, seemed to be somewhat *hyper*sensitive to all qualities except cold. The ulnar side of the middle finger, both palmar and dorsal aspects, showed diminished sensation. When the patient was touched over the scar on the palm of the left hand—the scar made by a previous operation on the ulnar nerve—he perceived the sensation in another scar situated on the ring finger of the same hand. When he was touched over the scar in the ring finger, he located the sensation correctly. The hyperæsthesia was doubtless due to the irritation of the nerve fibres caused by the presence of the tumors. Pain prevented a firm grasp by the left hand. . .

the pulp of the ring finger opposite the last interphalangeal joint (*f*, Fig. 1), two quite small tumors were found, and the entire nerve, with these

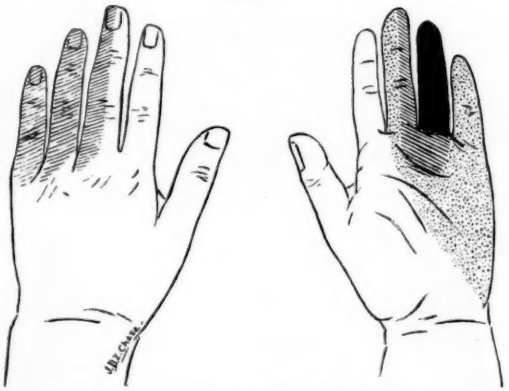
two tumors, was removed (see Fig. 4). All the tumors were oval in shape, with a small filament at each pole (see Fig. 4).

The fistula was then operated upon.

He made an uninterrupted recovery without febrile reaction, and left the hospital on the twelfth day, entirely well.

He writes me, under date of November 14th, that his present condition is as follows: He has no pain either in his hand or arm, and has full use of the hand, but still suffers from rheumatism.

FIG. 3.



Showing the condition of the sensation in the left hand of B. L., April 27, 1899, nine days after the operation. The black area represents the nearly anæsthetic area, the parallel lines on the palmar surface represent the hypæsthetic area, and the dots the hyperæsthetic area. On the middle finger the hyperæsthesia was uncertain. On the back of the hand the parallel lines represent the slightly hyperæsthetic area.

Sensation was tested for heat, cold, pain, and touch, and the limits of the areas corresponded for each form of sensation, *i. e.*, there was no dissociation of sensation. The palmar surface of the left ring finger was almost anæsthetic in all forms of sensation. The *ulnar* side of the middle finger was hypæsthetic, but the thumb side of the middle finger and the whole of the little finger, and the ulnar side of the palm as high as the wrist, were slightly *hyper*æsthetic; except that the portion of the palm above the middle and ring fingers was *hypæsthetic*; above the wrist disturbance of sensation was uncertain. The thumb and first finger exhibited normal sensation.

On the dorsal aspect the middle, ring, and little finger were somewhat more sensitive than the corresponding fingers of the right hand. The thumb and first finger were normal. The back of the hand was also normal.

REMARKS. In Dr. Spiller's report on such neuro-fibromata most of the essential facts are stated, and the most important references are given, and need not be recapitulated here. Operation is essential, for if left the tumor steadily increases in size. This results in constantly increasing pain, and by reason both of the pain and its consequent motor disturbances the usefulness of the hand is impaired or even lost. Moreover, from the constant pain the patient becomes very irritable. Malignant degeneration in a nerve after neuro-fibromata have been removed is by no means unknown, but the risk incurred by such an operation is

justifiable in view of the symptoms produced by the tumors, and malignant degeneration may occur in these tumors even when no operation has been performed. In the present case the mode of operation was clearly indicated, and when the tumors are central in the nerve, as in this case, they should be shelled out. If they exist upon the side, they should be dissected carefully from the nerve, doing as little injury to its fibres as possible, yet removing as far as possible all the diseased tissue. Whether all diseased tissue has been removed is an extremely difficult thing to determine absolutely, for from each pole of the tumor the disease may pass a considerable distance up and down the nerve, or it may exist at some other part of the nerve without causing clinical manifestations. If the tumor is too large or too intimately connected with the nerve to allow of either of these methods of operation, two resources still remain; first, a resection of the entire nerve or amputation of the limb. The latter is not uncommonly necessary in the leg, because such tumors, in connection with the sciatic, are apt to be very large and also to undergo malignant change. Resection of even so large a nerve as the sciatic does not always result in total paralysis, and even should this follow, sensation and motion may occasionally be restored either through lateral paths or by a greater or less regeneration of the nerve. Such complete regeneration I have seen personally more than once in the inferior dental nerve.

One danger attends operation, especially if all the diseased tissue has not been removed, namely, a rapid and malignant recurrence.

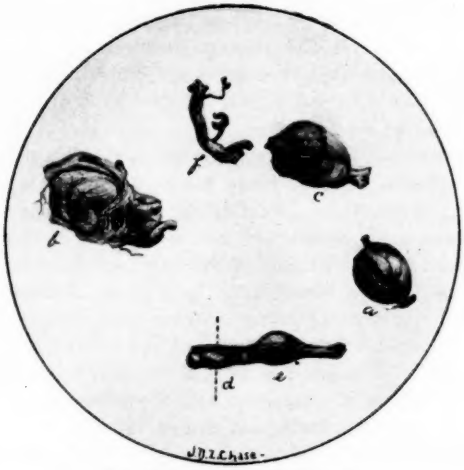
In Robert W. Smith's monograph, republished in 1898 by the New Sydenham Society, many admirable drawings of such tumors will be found.

### Pathological Report by Dr. Spiller.[1]

The tumor designated in Fig. 4 as *c* was studied microscopically. Sections made about half-way between the two ends of the growth showed that the centre of the sections was formed by dense bands of connective tissue interwoven with one another and running in various directions. Most of these fibres had a transverse course, but some ran longitudinally, and were, therefore, cut transversely in transverse sections of the tumor. Numerous nuclei, deeply stained by Delafield's hæmatoxylin, were found mingled with the fibres, and most of these nuclei were elongated; some, however, were round. It is difficult to determine whether the latter were merely elongated nuclei, cut transversely, or were really round nuclei, but probably most of them were elongated nuclei. Toward the periphery of the growth the fibrous tissue was looser and contained many nuclei, and this looser fibrous tissue passed rather abruptly into the circular bands forming the perineurium (Fig. 5). Bloodvessels were rare in the centre of the tumor where the

[1] From the William Pepper Laboratory of Clinical Medicine, University of Pennsylvania (Phœbe A. Hearst Foundation).

FIG. 4.



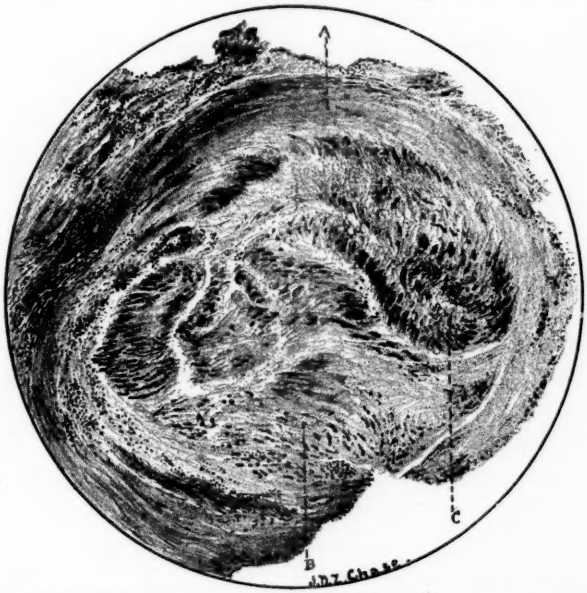

Actual size of the tumors removed.

FIG. 5.

Oc. 3, Ob. 3. A section from the tumor taken near the centre of the growth. *a*, perineurium; *b*, loose connective tissue near the periphery of the growth; *c*, dense connective tissue forming the centre of the tumor.

dense fibrous tissue was found, but were quite numerous in the looser tissue at the periphery. About some of the vessels at the periphery of the growth an area was found that showed a groundwork not staining well with ammonium carmine, but containing numerous delicate wavy fibres arranged circularly about the vessel. By Weigert's hæmatoxylin method a few scattered nerve fibres were seen within the looser tissue at the periphery of the tumor, but none were found in the central dense fibrous formation. The perineurium was not much thickened. The proliferation of connective tissue evidently began in the endoneurium and in the centre of a nerve bundle. Nerve fibres were found in sec-

FIG. 6.



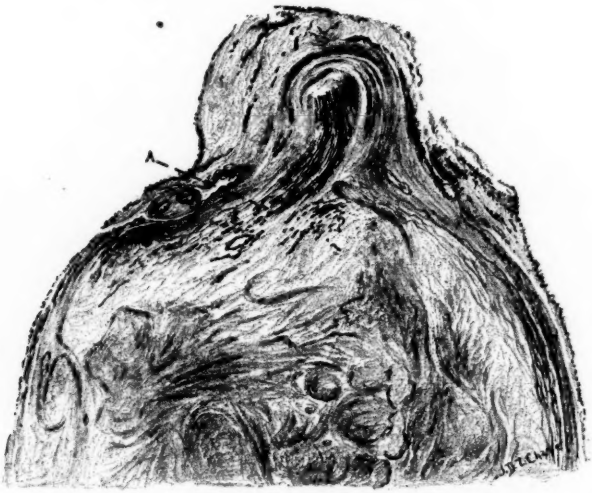

Oc. 3, Ob. 3. Transverse section from one extremity of the tumor, *c*, showing the nerve fibres widely separated from one another by proliferated connective tissue; A, perineurium; B C, nerve fibre.

tions taken from each end of the tumor (Figs. 6 and 7), and it was evident from these and the sections from the middle of the tumor that nerve fibres extended from one extremity of the tumor to the other, although they were not numerous.

The description of the tumor designated as *c* in Fig. 4 applies to the smaller growth designated by the letter *d* at the part marked by a horizontal line. In the tumor *d* the zone of looser fibrous tissue was between a dense central and a dense peripheral area. This small tumor also contained a few nerve fibres distinctly shown by Weigert's hæmatoxylin method. In some of the nerve bundles removed—seen as a narrow band upon the tumor *d* in Fig. 4—and cut with the tumor *d*, the connective

tissue proliferation was seen in an early stage; the individual nerve fibres were separated a little more than normally by a slight excess of connective tissue, and in some places where the connective tissue was in still greater amount the nerve fibres appeared somewhat atrophied, as though they had suffered from the pressure of the proliferated tissue. In these nerve bundles the proliferation was distinctly seen to begin in the endoneurium. These nerve bundles were distinct from the tumor *d*, but formed an integral part of the tumor immediately adjoining, designated as *e* in Fig. 4. This was proof that the proliferation of the

FIG. 7.




Oc. 3, Ob. $a_2$ (Zeiss). Longitudinal section of the tumor *c*, showing medullated nerve fibres entering at one extremity of the growth and passing to the periphery of the tumor (*A*).

endoneurium was not confined to one or two nerve bundles within the ulnar nerve, and it would indicate that at one part of the nerve one bundle was affected, and at another part another bundle.

The piece of nerve designated as *f* in Fig. 4 was found by microscopical sections to contain three nerve bundles presenting different degrees of thickening of the endoneurium, and the perineurium of these bundles was considerably thickened.

The connective tissue of the nerves in some persons exhibits a remarkable tendency to proliferation, and this proliferation may cause the condition known as generalized neuro-fibromatosis, in which multiple neurofibromata, multiple cutaneous fibromata, plexiform neuro-fibromata, elephantiasis of the skin, and pigment nævi occur.

To one unfamiliar with the literature the classification of fibro-neuromata with some of the forms of generalized fibromatosis mentioned would seem unwarrantable, and a brief *résumé* of some of the more

important papers is desirable for a proper understanding of this rather difficult subject, especially as most of the literature is in the German language.

The relation of these various pathological formations to one another has not been universally recognized. Virchow believed that a relation existed between the multiple cutaneous fibromata, the neuro-fibromata, and certain forms of congenital elephantiasis (Goldmann), and v. Recklinghausen[1] showed that the fibromata mollusca are fibromata developed on the cutaneous branches of nerves. Marie[2] states, in an excellent paper on this subject, that v. Recklinghausen's view is pretty generally accepted, but not by all. Marie does not include every fibroma molluscum under the generalized neuro-fibromatosis. In one of the two cases of general neuro-fibromatosis reported by him an autopsy was obtained. He was unable to find any fibromata on the nerves, or to find nerve fibres in the cutaneous tumors removed from the cadaver. The case clinically was a typical one of generalized neuro-fibromatosis, and in two cutaneous tumors removed during the life of this patient a few nerve fibres were found. The absence of nerve fibres in the tumors removed from the cadaver, of course, does not prove that these tumors did not have their origin in the cutaneous nerves. The cutaneous nerves are small and may be destroyed in fibromatous thickening. The examination of the growths removed by Professor Keen has shown me that the nerve fibres within the tumor may be entirely destroyed in places by the proliferation of the connective tissue, and this is doubtless true of the nerve fibres in the fibromata of the skin.

While certain writers have contended that the multiple fibromata of the skin arise in the connective tissue of the cutaneous nerves, some make the connective tissue surrounding other structures—about the roots of the hair, glands, and vessels—responsible for the proliferation. This question has not been positively decided. For example, Goldmann[3] reported a case of congenital plexiform neuroma (the first case in his paper) in which microscopically numerous fibromata were found in the skin, and all of these were in relation with cutaneous nerves. Apparent thickening of the adventitia of the vessels, of the hair sheaths, of the sweat-glands and sebaceous glands was in reality due to a fibromatosis of the nerves supplying and surrounding these structures. This case supports the view of the unity of the process in multiple cutaneous fibromata and multiple fibro-neuromata of the nerves. On the other hand, in a paper published by Finotti[4] three years later, different conclusions were reached. Finotti believed from his studies that the mul-

[1] v. Recklinghausen. Ueber die multiplen Fibrome der Haut, etc., 1882.
[2] Marie. Leçons de clinique médicale, Hotel Dieu, 1894-1895.
[3] Goldmann. Beiträge zur klin. Chirurgie, 1893, vol. x.
[4] Finotti. Virchow's Archiv., 1896, vol. cxliii. p. 133.

tiple fibromata did not originate exclusively in the nerves. The writers seem to agree that in structure the cutaneous fibromata and the fibro-neuromata of the nerves are very similar. The literature on this subject is given in a recent paper by Merken.[1]

The generalized neuro-fibromatosis is known also as v. Recklinghausen's disease and as elephantiasis nervorum. Under the latter term Hartmann[2] classes the neuro-fibromata of the nerves, the fibromata mollusca, cutaneous enlargements, and pigment spots—all are manifestations of a congenital tendency of peripheral nerves to tumor-formation. The designation of elephantiasis neuromatodes is employed by Scheven[3] to include plexiform neuromata, fibromata mollusca, and fibromatous thickening of nerve trunks.

The plexiform neuroma seems to be a part of generalized neuro-fibromatosis. P. Bruns[4] has had an unusual opportunity to study this form of growth—as the study of eight cases of this rare tumor may well be considered unusual. He says that the Rankenneuroma (plexiform neuroma) is one of the forms of congenital elephantiasis known also as the fibromatous diathesis, and is the result of fibromatous thickening of the nerves of a circumscribed territory. It differs only in form from the multiple fibromata of the skin and nerve trunks. This is shown by the congenital and occasionally hereditary tendency to the formation, the simultaneous appearance of the different forms in the same person, the same histological structure, etc. Bruns was able to collect in all, including his own, forty-two cases of plexiform neuroma from the literature (1891); in three of these heredity was observed through three generations; in the first two generations multiple cutaneous fibromata, multiple fibromata of the nerve trunks, and elephantiasis occurred, and in the third generation the plexiform neuroma appeared. Bruns, therefore, classes under elephantiasis the plexiform neuromata (Rankenneuroma), multiple cutaneous fibromata, multiple fibromata of the nerves, and colossal elephantiasis; and he shows that the disease may be hereditary, appearing in one form in one generation and in another in a following generation. The term elephantiasis neuromatodes seems to have originated with Bruns, but he distinguishes other forms: the elephantiasis teleangiectodes and the elephantiasis lymphangiectodes, according as the bloodvessels or lymph-vessels are involved.

The relation between multiple fibro-neuromata and elephantiasis was recognized in two cases by Jordan.[5] The vascular system was the source of a connective tissue hyperplasia causing great thickening of the skin and subcutaneous tissue and the formation of tumors in the nerves and

[1] P. Merken. Wiener klin. Wochenschrift, 1899, Nos. 32, 33, and 34.
[2] Hartmann. Beiträge zur klin. Chirurgie, vol. xvii. p. 177.
[3] Scheven. Ibid., p. 157.
[4] Bruns. Ibid., vol. viii. p. 1.
[5] Jordan. Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie, vol. viii.

muscles. Fibromata mollusca were found in both cases. In one patient the right lower limb had a circumference of 75 cm. and the left 22 cm., and the right lower limb was greatly deformed. Jordan was unable to classify these cases under any of the three forms of elephantiasis (elephantiasis fibromatosa, teleangiectodes, neuromatodes) known to him. Macroscopically the condition was one of elephantiasis fibromatosa with multiple fibromata mollusca, multiple neuromata, and thickening of the large vessels; microscopically the vessels were found to be the structures in which the hyperplasia began, so that in both cases there was a combination of different forms of congenital elephantiasis. Jordan doubts whether cases of congenital elephantiasis in which only the skin and subcutaneous tissues are affected exist—*i. e.*, cases of solitary pachydermatocele.

Herczel[1] was able to observe that in a pachydermatocele the proliferation of the connective tissue originated in the thickened fibrous nerve bands; that it was a true elephantiasis neuromatodes.

The frequency of pigment nævi in generalized fibromatosis has been noted by many writers, and in a careful microscopical study Soldan[2] has recently shown that these pigment nævi (Pigmentmäler) are in the majority of cases the first recognizable signs of a fibromatous process of the connective tissue of the nerves. The different forms of neuro-fibromatosis are conditioned by the localization, anatomical relations, and energy of growth.

This brief summary of some of the most important writings on generalized neuro-fibromatosis is sufficient to show that we are justified in classing under one head the neuro-fibromata of the nerves, the cutaneous fibromata, the plexiform neuromata, certain forms of elephantiasis, and certain pigment nævi. It does not follow, however, that all cutaneous fibromata arise in the nerves.

The causes of generalized neuro-fibromatosis are unknown. Reference has been made to the fact that heredity plays a rôle in some families, and in addition to the cases cited I may mention that Menke[3] observed neuromata in members of three generations—grandmother, mother, and son—and he says a heredity through three generations existed only in the cases cited by Herczel, Bruns, and Czerny. Most writers agree that the condition is not usually an acquired one. The tendency exists from the birth of the person, although the proliferation of connective tissue may not be observed until comparatively late in life. Trauma may in some cases cause the manifestation of a latent tendency in nerves.

Another important question that demands attention is in relation to

[1] Herczel. Ziegler's Beiträge, vol. viii.
[2] Soldan. Archiv für klin. Chirurgie, vol. lix., No. 2, p. 261.
[3] Menke. Berliner klin. Wochenschrift, October 31, 1898, No. 44, p. 974.

the tendency of these fibromata to malignant degeneration. Several investigators have shown that this danger is not an imaginary one. Goldmann (*l. c.*) demonstrated by one of his cases that an apparently benign neuro-fibroma may undergo malignant change, or, better stated, present a malignant course, and he quotes a number of similar cases. According to him, this malignancy is not a change in the character of the tumor, but is due to the fact that a sarcoma of the nervous system may occasionally show a slow growth for a long time.

According to Finotti (*l. c.*), numerous observations have demonstrated that solitary plexiform (Herczel) and multiple neuromata (Genersick, Czerny, Winiwarter, Westphalen) have a great tendency to change into sarcomatous tissue. His words are "Umwandlung in Sarcomgewebe." Distinct clinical differences between secondary and primary sarcoma—that is, neuro-fibromata that have undergone sarcomatous change and those that are sarcomatous from the beginning—do not exist, according to Finotti, at least not in the majority of the cases.

Trauma may be the cause of this malignant degeneration, but in some cases no cause can be demonstrated (Garrè, Hartmann and others). Hartmann states that one of a number of neuromata may increase rapidly in size, and when it is removed by operation another tumor may develop rapidly in the same nerve trunk at the site of the former growth—more frequently, however, in another nerve territory. The second tumor is usually more malignant than the first; it involves adjoining tissue, and comparatively late metastasis occurs, causing the death of the patient. Garrè[1] also noted the increased malignancy of the process after operation. Hartmann[2] reports a case which he says showed well the transformation of a fibroma of the nerve into a sarcoma, and he confirms the experience of others that the rapid increase in a neuroma, the occurrence of neuralgic pain, and sarcomatous degeneration occur at the same time. He refers also to the fact that in ten of the seventeen cases of malignant degeneration in fibro-neuromata mentioned by Garrè death was due to a return of the tumor.

Four cases of general neuro-fibromatosis, with multiple neuro-fibromata, were observed by Thomson.[3] In the first of these one of the tumors underwent sarcomatous change, with general dissemination of sarcoma and death after attempted removal; in the second also, after operative intervention, malignant change occurred. Scheven (*l. c.*) also refers to the pronounced tendency of the elephantiasis neuromatodes congenita to sarcomatous change, and to the fact that this tendency remains in the fibromatous nerves after a tumor that has undergone a malignant change has been removed. The surgeon can do nothing

[1] Garrè. Beiträge zur klin. Chirurgie, vol. ix. p. 465.
[2] Hartmann. Ibid., vol. xvii. p. 177.
[3] Thomson. British Medical Journal, October 10, 1896, p. 1024.

more than remove the malignant tumor; the tendency to degeneration remains in the widely developed pathological tissue. Scheven reports also a case of malignant degeneration in elephantiasis neuromatodes, and refers to the fact that in Finotti's case the sarcomatous transformation in the neuroma could be demonstrated microscopically.

We owe to Garrè's (*l. c.*) investigations the knowledge of the frequency of the degenerative change in neuro-fibromata. Garrè was able to collect sixteen cases from the literature—seventeen with one of his own—in which sarcomatous degeneration in congenital neuromatosis had occurred. There are, of course, many more cases of malignant tumors of nerves not the result of degeneration of a fibro-neuroma. In these seventeen cases those of sarcoma arising in cutaneous fibromata are not included. Garrè showed that in an eighth of all cases of supposed benign neuro-fibromata this sarcomatous change occurs.

It is important to know what constitutes a sarcomatous degeneration in a neuro-fibroma. Rapidity of growth is suspicious, according to Garrè, but is not always reliable; large size of the growth is not a positive sign, and even histologically the transformation of a benign fibroma into a sarcoma may be difficult to determine. The greater or smaller number of tumor cells is the determinative factor, but there are cases in which the diagnosis between fibroma and sarcoma cannot be made with certainty, and Garrè says that there are transitional forms between the neuro-fibroma and the sarcoma, and that these cannot be properly classed clinically or histologically. Paræsthesia, paresis, neuralgic pain, etc., are important in diagnosticating early and clinically the sarcomatous degeneration of a neuro-fibroma. The malignant change causes rapid destruction of the nerve fibres within the tumor, with the production of disturbances in motility and sensation.

It seems to me a broad and proper view to regard such neuro-fibromata as were removed by Professor Keen as an incomplete manifestation of generalized neuro-fibromatosis, although the process was confined to one nerve—the ulnar. The fibromatosis does not differ from that occurring in cases with more extensive clinical manifestations, and the limitation of the process so far is no proof that later we shall be unable to trace evidences of a more general fibromatous change. A number of cases have shown that the fibromatosis of nerves may remain undetected until the patient is well advanced in years. We understand likewise that Professor Keen's patient is exposed to the danger of malignant growth at any time.

The location of the tumors in Professor Keen's patient is especially interesting. Garrè, in speaking of his case, says that the presence of multiple small fibromata in the skin of the sole of the foot was very remarkable, and refers to the fact that v. Recklinghausen emphasized the immunity of this part and of the palm of the hand. Marie (*l. c.*)

likewise says that in generalized neuro-fibromatosis the tumors are not usually found in the hands and feet.

It is curious that only certain nerve bundles of the ulnar nerve were affected in Professor Keen's patient, but such a condition is well known. Goldmann (*l. c.*) says it is difficult to understand why in the same nerve trunk, even in the same bundle, the proliferation may involve only certain groups of fibres.

Bowlby[1] describes a specimen of multiple fibromata on a single nerve (posterior tibial) seen in the museum of the Middlesex Hospital. No tumors were found on any other nerve. This seems to have been the only case of the kind which had come under his observation when he wrote his book. A similar case was published by J. K. Mitchell,[2] and W. J. Taylor operated on a patient with neuro-fibromata of the foot, probably confined to a single nerve. As a contrast to Professor Keen's case and to Bowlby's I may mention that Smith reported one case in which the total number of neuro-fibromata existing upon the nerves removed from the body exceeded 800, and another in which upward of 1400 neuromatous tumors were removed with the nerves, and he felt that he was not exaggerating in stating that this patient must have had at least 2000 tumors. This work of Smith was originally published in the form of a very limited edition fifty years ago, but it was deemed of sufficient importance to be reprinted in 1898 by the New Sydenham Society. Some of the plates present nerves covered thickly with fibro-neuromata, but no neuromata shelled out of a nerve, as in Professor Keen's case, are pictured in this atlas. Indeed, Smith[3] stated that the results had not afforded much encouragement to the practice of dissecting out the tumor from the branches of the nerve among which it was entangled. According to Smith, there are few affections more rare than neuro-fibroma.

Smith was not able to trace nerve fibres through a neuro-fibroma, although in a few instances he observed some nervous filaments entering the superior extremity of the tumor. I have been able to detect the presence of nerve fibres in both extremities and also in the centre of one of the tumors (*c*, Fig. 4) removed by Professor Keen, and my success was probably due to the fact that I had Weigert's hæmatoxylin stain at my command. In the smaller tumor (*d*), nerve fibres were also seen within the tumor. This method was unknown when Smith wrote his treatise.

It is a merciful provision that the multiple neuro-fibromata are usually painless, and it seems extraordinary in contrast that the solitary tumor is often painful.

[1] Bowlby. Injuries and Diseases of Nerves and their Surgical Treatment, p. 493.
[2] J. K. Mitchell. The University Medical Magazine, November, 1897.
[3] Smith. A Treatise on the Pathology, Diagnosis, and Treatment of Neuroma. The New Sydenham Society, 1898.

Many investigators have observed that the proliferation begins in the endoneurium, as it did in Professor Keen's case. It is due to this mode of origin that these neuro-fibromata are elongated with their long axes parallel to the nerve. The perineurium offers a certain amount of resistance, especially as it often becomes thickened simultaneously with the growth of the tumor, and the fibroma grows especially in the direction of least resistance. In the tumor designated as *c* in the drawing (Fig. 4), the perineurium forms a sheath, surrounding on all sides the proliferated endoneurium, and in the centre of the tumor no nerve fibres could be detected, except at the periphery. This proliferation of the endoneurium was evident also in the tumor *d* (Fig. 4), and in small nerve bundles, adjoining the tumor *d* and removed with it, the proliferation of the endoneurium could be detected in its early stages. Neuro-fibromata do not always originate in the endoneurium. In a case reported by Finotti, for example, the fibroma began in the epineurium and was adherent to the nerve.

The entire nerve on which the neuroma is formed may lie in the centre of the tumor or surround the tumor as a sheath. According to L. Bruns,[1] the nerve fibres caught within the neuro-fibroma show a remarkable resistance to degenerative processes, which explains the absence or mildness of the clinical symptoms in many cases. I am unable to fully confirm this statement from the examination of the tumors removed by Professor Keen. In two tumors, *c* and *d*, I found the nerve fibres within the tumor entirely destroyed, except at the periphery of the tumors, while in the piece of nerve marked *f*, in which the proliferation was not excessive, the nerve fibres were quite well preserved. I would prefer to explain the absence or mildness of the clinical symptoms by the slowness of the process, by the fact that only here and there a nerve bundle is attacked, and that many fibres —the majority in fact—remain intact and do not lose their function, although considerably compressed, as the process is slow enough to allow the nerve fibres to become accustomed to the pressure.

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## THE DIFFERENTIAL DIAGNOSIS OF ECTOPIC GESTATION.[2]

WITH THE REPORT OF CASES.

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IN the classic description of ectopic gestation the patient is said to have a uterus slightly enlarged, a tumor near the womb, and the sub-

[1] Bruns. Die Geschwülste des Nervensystems.

[2] Read before the College of Physicians, Philadelphia, March 7, 1900.

jective signs of pregnancy. When the gestation sac ruptures, in most cases these signs become more evident because the tumor increases through the formation of an hæmatoma. These signs, taken with the symptoms of anæmia and shock, point almost conclusively to the condition present.

It has been my experience to observe two cases of ruptured ectopic gestation in which the classical signs were absent, and in which the differential diagnosis became a matter of great interest. Surgeons and physicians are called upon so frequently to treat patients in whom pain in the abdomen is associated with some degree of shock that the narration of these cases may not be without interest.

CASE I. was that of a primigravida of frail physique and highly organized nervous system, the wife of a physician. This patient had been married ten years, had menstruated regularly, and had never been pregnant. She supposed herself in perfect health, and was without signs of illness, when one day she rode upon a bicycle between one and two miles at a rapid rate, and during this ride was seized with a sharp pain in the right lower quadrant of the abdomen. She controlled her distress, however, and returned to her home upon her bicycle.

When seen soon afterward she had manifest shock, the abdomen was not swollen nor painful upon pressure, and there was no hemorrhage from the vagina. Palpation of the abdomen was negative. The patient instinctively flexed the thighs and began very soon to recover from the shock. She was at once put at absolute rest and in charge of a good nurse. Within a few hours her husband saw her, and, at his request, a vaginal examination was made, the results of which were negative. A possible enlargement of the uterus was present, but this was scarcely noticeable. Upon questioning the patient she remembered that she had not been unwell at the usual time and had gone between one and two weeks over the expected date. There was no history of severe previous illness, of obstinate constipation, of mechanical injury, or of apparent hemorrhage. There was entire absence of a tumor near the womb, of a distinct enlargement of the uterus, or any evidence by examination that hemorrhage had occurred into the abdomen or pelvis. The husband was informed that ruptured ectopic gestation was possibly present. The first pain which the patient experienced occurred at about 1 P.M. During the afternoon and evening the patient steadily reacted, although complaining of pain in the lower abdomen. The pulse and temperature were but slightly altered. The patient was given stimulants and morphine by hypodermatic injection. Preparations were made to open the abdomen in the early morning should indications arise.

Between 5 and 6 A.M. the patient grew worse, and as soon as possible the abdomen was opened. It was found that ectopic gestation in the right tube was present, that the wall of the tube had partially ruptured, and that the orifice had been closed temporarily by a clot. Later this had given way, and hemorrhage had taken place upward and backward among the intestinal coils. The tube was at once ligated and removed. The patient perished from shock within a few moments after the close of the operation.

In this case the diagnosis lay between ruptured ectopic gestation, disease of the appendix, ectopic pregnancy with threatened abortion, and the onset of delayed and painful menstruation. This last point may be illustrated by Case II.

CASE II. was a woman who had borne two children in normal labors and who had menstruated regularly since the birth of her younger child. She was ordinarily in good health, but subject to intestinal colic and to indigestion. About the time when she should have been unwell, after exposure to cold and wet, she was attacked by severe pain in the left lower quadrant of the abdomen. This pain was reflected to the right side. The entire lower abdomen was painful upon pressure, the attacks of pain were successive at intervals of from twelve to twenty hours, and on one occasion the patient was seized, while sitting, with such severe pain that it was necessary to give her an injection of morphine before she could be placed in her bed. Her husband, a physician, made a vaginal examination, and, finding the uterus slightly enlarged, introduced a sound. The uterus was proved to be enlarged and probably empty. On examining the patient no pelvic tumor could be discovered, the womb was a trifle larger than normal, the abdomen sensitive as described, the patient's pulse slightly quickened, and her temperature normal. The attacks of pain had been so severe that the patient, although a courageous woman, dreaded the possibility of return. The bowels had moved thoroughly without difficulty.

The diagnosis of ectopic gestation seemed not impossible in this case. The husband was exceedingly apprehensive that such was the condition. On close questioning, however, the history of previous attacks of intestinal colic was elicited, and it was found that the pain while severe was unaccompanied by shock. The patient was placed at absolute rest, small doses of codeia were given, the diet was limited to liquids, counter-irritation was placed over the abdomen, and the patient was carefully watched. In a short time menstruation appeared, and the patient speedily recovered.

In this case subinvolution accounted for the enlargement of the womb, the pain was that of intestinal colic, although its severity was unusual. There was but one classic symptom of ruptured ectopic gestation lacking and that was shock. A sign of ectopic gestation so often present—a tumor in the pelvis—was absent in this case.

Ectopic gestation may be complicated by the nausea of pregnancy, and the latter may for a time obscure the diagnosis.

CASE III.—Mrs. S., aged forty years, was seen in consultation with Dr. Louis Jurist in December, 1899. Her only child was nineteen, and she had menstruated irregularly. For several months she had suffered from pain in the stomach with loss of appetite and persistent nausea. Her menstruation had probably been absent for nearly two months. There had been a vaginal discharge of blood four weeks before she was seen, although this did not seem to be the usual period. Eight days before coming under observation she had pain in the abdomen, which subsided after she had remained in bed. The patient denied positively the possibility that pregnancy was present. After slight im-

provement she left her bed and went about the house, when she was seized with sharp pain in the abdomen and severe shock. When seen by Dr. Jurist she was pulseless at the wrist, but gradually rallied.

When examined in consultation with him the patient was pallid, restless, thirsty, her pulse 122, small and weak, the tongue dry, coated, and brown in the centre, the abdomen was slightly enlarged in its lower half, painful on pressure, not tympanitic. On vaginal examination the womb was not evidently enlarged, was freely movable with very slight pain, and there was no tumor, exudate, nor mass in the pelvis. The cervix was unaltered.

The early history of the case was of marked gastro-intestinal trouble. The patient's nausea had been irregular but persistent, chronic constipation and dyspepsia had been present, and disease of the appendix had been strongly suggested by the symptoms. There was also a history of irregular menstruation, of previous disease of the womb or Fallopian tubes, whose exact nature could not be determined from the very obscure history given. It was my belief that the patient was suffering from ruptured ectopic gestation, the rupture occurring in the upper and posterior portion of the Fallopian tube, and the blood extravasating among the coils of intestine. She was at once transferred by ambulance to Dr. Keen's private hospital and prepared for cœliotomy. Upon consultation two views were expressed: one that the patient was suffering from ruptured abscess of the appendix and consequent infection of the abdomen, the other that ruptured ectopic pregnancy was present. In view of the first opinion I asked Dr. Keen to operate and assisted him. An incision was made over the appendix and Fallopian tube, and extravasated blood found amid the intestinal coils. An early embryo was found just above the right cornu of the uterus, and, with a mass of blood clot, was immediately removed. The site of the pregnancy had been the right cornu of the womb and the Fallopian tube at the point where it enters the uterus. The end of the tube was readily ligated and the torn portion removed, but persistent oozing occurred from the wall of the uterus. This was finally checked by ligating in mass and by the use of the thermo-cautery. Normal salt solution was poured into the abdomen and a packing of iodoform gauze carried behind the uterus, compressing the site of bleeding. This gauze was brought out at the lower end of the abdominal incision. Intravenous transfusion of fifty ounces had meantime been given. Although the patient's condition was critical during the operation, she reacted well. The embryo was 8 cm. long, and the chorion was found in the blood clot removed. This patient made an uninterrupted recovery, retarded somewhat by excessive nervousness and chronic intestinal catarrh.

But little mention is made in writings upon ectopic gestation of cases in which positive evidence of pregnancy and pelvic tumor are lacking. The possibility of their absence is admitted, but held to be extremely rare. In a considerable number of cœliotomies upon women, Schauta (*Monatsschrift für Geburtshülfe*, 1900, Band xi., Heft 1) found that ectopic gestation had been present in 5 per cent. of his cases. In many of these it had not been diagnosticated, and operation was performed for pelvic tumor or tubal disease. From Case I. we observe that when the rupture in the tube is but slight it may be closed temporarily

by a clot, and the patient may rally from the initial rupture. An early embryo may readily die under these conditions, and, its absorption taking place, the patient would gradually return to her accustomed health. The diagnosis of these cases may be impossible under such circumstances. When the rupture is in the right tube (and this is more frequently the case than in the left) it is very difficult to distinguish between this condition and infection of the appendix.

From these cases we believe that shock referred to the abdomen occurring in women capable of pregnancy should invariably cause a suspicion of ectopic gestation, and that although pelvic tumor may not be found and many signs and symptoms of pregnancy be obscure, if the shock be pronounced the abdomen should be opened and the condition present accurately diagnosticated and promptly treated. We lay especial stress upon the development of shock as illustrated in Case II., where its absence was the only circumstance which made the diagnosis of ectopic pregnancy, to my mind, unlikely.

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## TWO CASES OF TABES DORSALIS IN NEGROES—HUSBAND AND WIFE.[1]

By Albert Philip Francine, A.M., M.D.,
of Philadelphia.

Tabes dorsalis is recognized as occurring rarely in the negro,[2] nine cases only having been reported; but the author has been unable to find reference to any instance in this race of the disease in husband and wife, as in the present case. Raecke[3] has collected twenty-two cases of tabes in husband and wife in which the subjects were white. Of four cases Weir Mitchell has seen, two occurred in mulattoes in Florida.

The following were both frank cases of tabes, the cardinal symptoms of the disease—*i. e.*, loss of reflexes, fulgerent pains, girdle sensation, ataxia and the eye symptoms—being typically demonstrable in both. The question of purity of blood, always a matter of doubt in the negro, is confirmed so far as the statements of the patients themselves are concerned. The occupation of the wife (having worked on a sewing machine for thirty-five years), in the absence of ascertainable evidence of specific infection, is interesting as a possible etiological factor. The mechanical[4]

[1] Shown before the Philadelphia Neurological Society, February 26, 1900.

[2] La Ataxia locomotriz (en el negro), Cron. Med. quir. de la Habana, 1892, xviii. 47-50. The Frequency of Locomotor Ataxia in Negroes. Burr. Journ. Nerv. and Ment. Dis., N. Y., 1892, xix. 278-281. F. H. Lloyd. Phila. Hosp. Reports, 1896, iii. 172 (case in negress).

[3] Paralyse und Tabes bei Eheleuten. Monatsschrift für Psychiatrie und Neurologie June, 1899, 266.

[4] Exhaustive Theory. Edinger. Sammlung klinischer Vorträge, No. 106, 1894.

or non-specific theory for the origin of the disease in contradistinction to the more generally accepted syphilitic etiology as advocated by Erb[1] and Fournier[2] would seem applicable here.

A rare and interesting symptom is the disassociation between superficial and deep sensation as elicited in the case of the man, by his being able to differentiate between the head and the point of a pin when applied lightly to the skin of the lower part of the leg, but unable to do so, and suffering no pain when it is forcibly stuck into the flesh.

The anesthetic patches on the woman's breast and the hyperæsthetic spots spoken of in her history are probably due to functional rather than organic disease.

The double ptosis in the same case is interesting, though not particularly rare. Wilbrand and Saeger[3] have tabulated 65 cases showing this symptom, in 40 of which the ptosis was bilateral, in 25 unilateral.

The following cases were met with by the author in the dispensary of the Howard Hospital, and he is indebted to Dr. Charles Wirgman for permission to report them. He also desires to express his thanks to Dr. J. M. McCarthy for assistance in the study of these cases:

CASE I. Joseph A. W., aged forty-eight, married, colored, a barber.

*Family History.* Mother died of consumption, father of typhus fever; two brothers living and in good health; one sister has been operated on for tumor.

There is no family history of nervous disease ascertainable; mother's family all died of tuberculosis. Careful inquiry fails to disclose the presence of any white blood in his family, and he denies the possibility of this. He is also in appearance very dark.

*Previous Personal History.* Has had measles as a child, and since he was ten years of age says he has been rheumatic.

As an adult he has suffered with typhoid fever and grippe, the former being complicated by pneumonia; has a chronic cough, and has had occasional hemorrhages. Examination of chest reveals the presence of phthisis.

Had a hard chancre when he was about seventeen years old, *i. e.*, in 1869. He was at once put upon specific treatment, and did not suffer with secondary eruptions, though he did have a temporary alopecia. For the last two or three years he has completely lost sexual power.

Was married in 1888 to Eliza A. W., shown with the patient; has been employed as a barber to within two years of the present time; is a man of temperate habits, though for many years he took a morning whiskey, and still takes an occasional drink; has always smoked a pipe through the day, and occasionally chews tobacco; uses both tea and coffee in moderation.

*History of Present Condition.* About five years ago patient began to suffer with difficult vision, for which he consulted an oculist, and tabes being suggested by the ocular findings, he was referred to the Ortho-

[1] Deutch. Arch. f. klin. Med., xxiv. 1879. Centralblatt für die med. Wiss., March, 1881.

[2] De l'Ataxie Locomotrice. Fournier, Paris, 1882.

[3] Die Neurologie des Auges. Wilbrand und Saeger, Wiesbaden, 1899.

pædic Hospital (May 17, 1895),[1] where the diagnosis was made. He suffered at this time with slight ataxia, lightning pains in legs and body, a girdle sensation, and numbness in the soles of his feet.

His ataxia has very gradually increased, and his pains continued to date. He says that the soles of his feet feel numb, and he cannot tell by the sensation, after he has removed his shoes at night, whether they are on or off, nor can he feel the floor when he walks in his bare feet.

He complains of a girdle sensation, and says that he has bladder trouble, which consists in difficulty in starting the act of micturition and some incontinence. At times during the last three years he has had involuntary seminal emissions without erection. Has considerable pain on going to stool; no gastric pain nor crises.

Complains also of shortness of breath on exertion, and says that he has lost weight.

*Physical Examination.* Patient is a small, dark-complexioned, colored man about five feet four inches in height, and weighs a hundred and thirty pounds.

His knee-jerks are absent, also to reinforcement, as are the plantar reflexes. There is marked dissociation between superficial and deep sensation, and slight retardation of tactile sensation in the soles of the feet. Muscular power is good. Babinski reflex is absent.

His gait is markedly ataxic and he walks with a cane. Station with the eyes open is fair, but with the eyes shut there is marked swaying. He is unable to walk in the dark. Coördination of the fingers is poor.

Hearing is good for both high and low pitched notes, and taste and smell appear to be normal. There are no hyperæsthetic or anæsthetic zones discoverable.

Examination of the eye by Dr. William Campbell Posey reveals 5/IV vision in right eye, 5/VII in left. Pupils 2½ mm. Irises do not react to light but promptly to accommodation and convergence. There are no palsies of external ocular muscles. Right optic nerve is pale, and the left decidedly atrophic (primary atrophy). Fields normal in right eye; fields in left contracted centrally for form and color.

CASE II.—Eliza A. W., (wife of the above), aged fifty-two years; married; colored; by occupation a seamstress.

*Family History.* Mother died of consumption; father of accident; one sister of consumption; one brother of smallpox. No family history of nervous disease ascertainable. Denies any white blood in her family.

*Previous Personal History.* Does not remember to have been sick much, even as a child. Has suffered with "cold in the head" from time to time, but has otherwise enjoyed uniformly good health. Has had a weak back, however, and has suffered with nervousness for the last ten or twelve years.

Has been married twice and had two children by first husband, the last being still-born. She accounts for the death of this child by an overdose of a powerful drug which was given her by a druggist for labor pains, and which made her violently ill. Says it was a full term child. Has had no miscarriages.

[1] Mentioned in "A Clinical Report on the Use of Testicular-fluid Injections." Pearce. Amer. Surg. Bull., May 9, 1896. Also included in statistics by same author of 194 cases of tabes in relation to "Diagnosis, Etiology, and Treatment." Therapeutic Gaz., October 15, 1898.

Was married to present husband, twelve years ago—*i. e.*, in 1888—and has never been pregnant by this marriage. Has been engaged in sewing and dressmaking for thirty-five years, and during that time has worked constantly on a sewing machine.

*History of Present Condition.* For some years has complained of a variety of nervous symptoms, chiefly of spots of hyperæsthesia, with sensations of pain, shifting from point to point, particularly affecting the back and abdomen, and induced by the slightest draught of air.

About a year ago—*i. e.*, in the winter of 1898–99—she began to suffer with sharp pains in legs and body. Shortly after this she noticed that she tripped over objects; and this was soon followed by slight difficulty in walking.

She complains especially of these sharp pains in her legs and body, and says that they disturb her rest at night. At times she has a sensation of a band being tightly drawn about her body at the lower margin of the ribs. She says she perspires very freely, but has no night-sweats; she also suffers with bad dreams. Has experienced slight dimness of vision, and uses glasses to read.

*Physical Examination.* Patient is a very stout colored woman, about five feet in height; she weighs a hundred and eighty-six pounds.

There is unilateral asymmetry of the face, which consists in drooping of the right eye and flattening of the face on that side. There is also a partial double ptosis of the external oculars, though no actual paralysis. Patient says that she has never suffered with facial palsy.

The knee jerks are lost, also to reinforcement. The plantar reflexes are gone, and there is slight retardation of tactile sensation in the soles of the feet. There are two anæsthetic patches on each breast, about the size of the palm of the hand, and involving the anterior surface and nipple region. There are, however, no true tabetic zones.

There is some inco-ordination; station with the eyes open is good, but with the eyes shut patient sways. Co-ordination of fingers is fair.

Her gait is slightly ataxic, and she walks with the help of an umbrella. She is apparently able to walk unsteadily for short distances with her eyes shut. Says she never walks in the dark. Muscular power is good. Babinski reflex is not present.

Hearing is markedly deficient to high-pitched notes, but is good for low tones. Taste and smell apparently normal.

Report on the eyes by Dr. Posey shows 5/IX vision in O. D.; 5/VI in O. S., due to far sighted astigmatism. Right pupil, 3 mm.; left, 4 mm. Irises do not react to light, but do to accommodation. No paresis of external ocular muscles. No optic atrophy, but fields of vision somewhat limited in extent for form and color.

# THE CLINICAL ASPECT OF PLAGUE.

## WITH ILLUSTRATIVE CASES.

By Frank G. Clemow, M.D. Edin., D.P.H. Camb.

(Concluded from page 414.)

## II.

In the first paper the appearances met with in plague in connection with the temperature, the alimentary system and the nervous system were discussed. In the present paper the remaining systems will be dealt with in the same manner.

The Circulatory System. The pulse in the acute stages of plague is almost invariably rapid. It may rise to 110 or 120, or considerably higher, pulses of 130 or even 150 on admission being by no means uncommon. Before death it may increase to 180 or more, and become thready and quite impossible to count. It is usually very soft and compressible; the arterial walls are relaxed and the blood-pressure apparently much below the normal. In many patients the pulse is irregular, both in rhythm and in strength of beat; and in not a few it becomes intermittent at some period of the disease. The pulse may intermit for a considerable time, and the intermittency may be continued well on into the convalescence of the patient. The low arterial tension not infrequently causes a degree of dicrotism in the pulse which can easily be detected by the finger. It would seem more than probable that the disturbances of the circulation just described are in part due to the high temperatures so common in plague, and in part to the action upon the nervous system of the toxins circulating in the blood—whether upon the medullary centres, the cerebro-spinal and sympathetic nerves, or the ganglia within the heart itself. The great rapidity of the pulse is doubtless caused both by defective action of the inhibitory mechanism and by an abnormal degree of stimulation of the cardiac ganglia and the accelerating fibres of the sympathetic. The low tension of the pulse may be regarded as to some extent due to a disturbance of the vasomotor nervous mechanism, resulting in a relaxation of the muscular coats of the arteries and consequent dilatation of the vessels; and this is probably aided in the later stages by a direct action of the poisons circulating in the blood upon the muscular fibres themselves, leading to a still further relaxation and dilatation. This direct action of the toxins upon muscular fibres must also be supposed to be present in the heart itself. The extreme degree of exhaustion of the heart-muscle which characterizes the later stages of the acute period can, indeed, scarcely be explained otherwise than as the result of this direct action upon the heart-muscle, in addition to the disturbances of

the nervous mechanism just described. So great is the exhaustion at this period, that if the least amount of extra work is thrown upon the heart, as by some sudden exertion on the part of the patient—and particularly by a sudden change from the horizontal to the upright position —the heart's action may fail altogether, and sudden collapse and death ensue. Gradual heart-failure, either from exhaustion of the nervous mechanism or of the muscular fibres of the heart-walls, or from both these causes, is the most usual cause of death in fatal cases of plague.

The heart-sounds in plague are always weak and muffled. Murmurs are never present, unless the patient is already the subject of some form of heart disease.

After death the heart-muscle, as a rule, shows no great sign of change, except that in many cases it is softer and more pliable than normal. There is not infrequently some dilatation of the right auricle and ventricle. The most characteristic appearances are caused by hemorrhages, which may be met with either under the pericardium or under the endocardium, forming mottled patches of reddish or purplish color and of varying size, but usually small. The blood is, as a rule, more liquid than normal.

The occurrence of hemorrhages in various parts of the body is a phenomenon of considerable frequency in plague. They give rise to appearances of very great diagnostic importance—less, however, during the life of the patient than after death. In India a considerable number of plague (and other) patients are not seen by the medical man in life, and it becomes of the utmost importance to be able to state with certainty the cause of death solely upon the post-mortem appearances. Next to the presence of a characteristic plague bubo the presence of hemorrhages is quite the most valuable diagnostic sign in a plague cadaver. In the living patient the internal hemorrhages give no certain sign of their occurrence, while external hemorrhages are comparatively rare and not, as a rule, serious. In this respect the present epidemic in India would appear to differ from most of the older epidemics of plague in the west Almost without exception the older writers upon plague dwell upon the occurrence of petechiæ and of hemorrhage from the nose, lungs, bowels, and kidneys. The black spots of the earlier epidemics and the "tokens" of the later ones, which were regarded as the most important diagnostic sign of the disease, appear to have been nothing else than subcutaneous hemorrhages or petechiæ. It is a remarkable fact, therefore, to which attention should be called, that in the present epidemic in India external hemorrhages have been not the rule, but comparatively rare exceptions. So far as my own experience goes, both in Bombay and in Calcutta, out of the many hundreds of cases I have examined, the appearance of petechiæ was present in two only. They gave the skin a dusky, mottled look, and,

owing to the natural color of a native skin, it was not easy to be certain that they were truly petechiæ. Hemorrhages from the lungs, bowels and kidneys were also of rare occurrence. Thus out of 502 patients admitted to the Parel Hospital, Bombay, hæmatemesis occurred in three cases only; blood was not observed in the stools in a single case; hæmoptysis was present in three and hæmaturia in three. In none of these instances was the amount of blood passed at all large or in itself a cause of death. In a few cases epistaxis occurred, but never to an alarming or fatal extent.

Deeper hemorrhages, on the other hand, around buboes and under serous and mucous membranes are extremely common, if not invariable accompaniments of the disease. The largest are those which occur around a bubo. On making an incision over a plague bubo which has not gone on to suppuration, the subcutaneous tissue and the deeper tissues around and below the glands themselves are almost invariably to some extent blood-stained The gland is usually embedded in a more or less extensive infiltration, often of a glistening and peculiarly gelatinous character, which may be merely pink from the presence in it of a small quantity of extravasated blood or blood-pigment, or which may be nothing more nor less than unmixed extravasated blood itself. These hemorrhages may pass a considerable distance in all directions around the inflamed gland; they may sometimes be traced up and down the course of an adjacent vessel. Thus in the case of an inguinal bubo, in which the deeper iliac glands are frequently enlarged in addition to the superficial inguinal glands, hemorrhages may be seen dipping down into the pelvis and following the course of the external iliac artery. Similarly, in a femoral bubo, the extravasated blood may be traced some distance down the course of the femoral artery. Occasionally, minute hemorrhages are seen in the intima of the artery itself. Hemorrhages of minute or of larger size may also be seen in the substance of the glands themselves when these are cut across.

On serous and mucous membranes hemorrhages are of very common occurrence in plague cadavers. They may be met with at almost any part of the parietal or visceral layers of the peritoneum, pericardium and pleura. The commonest position for them is at the lines of reflection of these membranes, particularly where they form the so-called ligaments, such as the falciform ligament of the liver or the broad ligaments of the uterus. They give rise to a very characteristic red or purplish mottling, generally made up of a large number of discrete hemorrhages. Each hemorrhagic patch varies in size from that of a hemp-seed to that of a sixpence; larger patches than this seem to be the result of the confluence of two or more small ones, and may consequently be very irregular in outline. Mottled patches of this kind are occasionally met with in large numbers in one and the same body, involving the

serous covering of every internal organ and the mucous lining of every hollow organ. In other cases they may be very few in number, and confined to perhaps a single patch on the liver or kidney; while in a few cases they are absent altogether.

Hemorrhages into the substance of solid organs may also be met with, but they are less common than those just described. They are usually punctate in character, appearing as small red spots when the organ is cut into. I have never seen hemorrhages larger than this in the substance of solid organs, except in the case of the gland or glands which form the bubo. Punctate hemorrhages I have seen in the liver, kidney, ovary and Fallopian tubes.

It has been necessary to digress thus far into the pathology of plague, as the hemorrhages here described, while an essential part of the disease, and one to which reference could not be omitted altogether, are primarily of pathological importance. They lend little to the clinical picture of the disease, except in those comparatively rare cases where the blood escapes into the stomach, or the respiratory or urinary passages, and gives rise to hæmatemesis, hæmoptysis or hæmaturia. They are not, however, altogether without clinical import. They appear to indicate a profound change either in the blood or the bloodvessels, or the relation between the two which allows of the escape of blood from the latter, a change which is very probably analogous or allied to that which occurs in pernicious anæmia.

In one instance, and in one only, an oozing of blood occurred from the gums, which became soft and spongy as in scurvy. This symptom appeared within less than twenty-four hours of death; it was not accompanied by visible hemorrhage elsewhere, and a post-mortem examination could not be obtained. The case was quoted in the first paper (Case XI.).

The Respiratory System. Very few cases of plague escape without some affection, however slight, of the respiratory system. In all cases during the acute period the respiration is, as might be expected, more rapid than normal; it is occasionally shallow and sometimes irregular. But the respiratory disturbance is rarely confined solely to these conditions, which may be regarded as simply febrile phenomena, and in most cases there is evidence of catarrhal or inflammatory involvement of the respiratory passages. On examining the chest of a plague patient it is extremely common to find rhonchi of various characters in some part of one or both lungs. They are more frequently present behind than in front. They may or may not be accompanied by a small amount of mucous expectoration. Not infrequently loud, moist sounds are heard, indicating the presence of fluid, whether bronchitic or œdematous, in the air-passages. Occasionally a true acute bronchitis is present, with scanty or profuse mucous, mucopurulent, or purulent

expectoration. If the patient survives more than the first three or four days of the illness, some degree of hypostatic congestion is very frequently present, and in not a few there may be a very considerable amount of œdema.

In one case, which ended fatally, the disease was complicated by an acute pleurisy with effusion on the left side, without apparent involvement of the lung itself. Some degree of pleuritic inflammation is frequently met with in cases complicated with bronchitis or pneumonia.

It is probably present in many cases without being detected in life, and on the post-mortem table it is far from uncommon to find light adhesions over some part of the lung surface, particularly if there is any inflammatory involvement of the lung tissue itself, in cases in which there had been no suspicion of pleurisy during life.

Hæmoptysis was noted as present in two cases only out of the 502 cases admitted to the Parel Hospital. In each case there was secondary pneumonia, and the hæmoptysis was limited to the presence of a small quantity of bright, fresh blood in the sputum before it assumed the pneumonic character.

In this same group of 502 cases secondary pneumonia developed in seventeen cases. It varied greatly in extent and severity from a single small patch of dulness with tubular breathing up to the consolidation of an entire lobe of one or both lungs. The onset was in each case rather insidious than sudden. The temperature rose and the pulse and respiration became more rapid. The sputum, which in most cases had been present before pneumonia set in, and had been of a mucous or mucopurulent character, became streaked with rusty blood and gradually assumed the appearance of pneumonic sputum. In such cases the sputum presented to the naked eye no divergence from that of ordinary croupous pneumonia; it was of a reddish-brown color, more or less tenacious in consistency, and was occasionally streaked with fresh red blood, which, in all probability, came from the pharynx or upper part of the respiratory passages. On examining the chest the physical signs of pneumonia were invariably discovered at some part of one or both lungs. In some cases more than one patch of consolidation was present. Occasionally the localized pneumonia is accompanied by a considerable degree of inflammation of the adjacent pleura, which may give rise to much pain and loud friction sounds, or may lead to effusion of a considerable quantity of fluid, and in either of these conditions the pneumonic signs may be to a considerable extent masked. But in such cases the appearance of the patient, the raised temperature, rapid pulse and respiration, the working of the alæ nasi, and the character of the sputum will generally enable a correct diagnosis to be arrived at. If at all extensive the development of secondary pneumonia greatly lessens the chances of the patient's recovery. But if confined to a single small

patch it need not of necessity be regarded as gravely affecting the prognosis; and of the seventeen cases just mentioned as many as five recovered, the condition of the lung completely clearing as convalescence progressed.

Primary plague pneumonia occurred in twelve cases of the group of 502 cases so frequently referred to above. It is quite possible that this does not represent the true proportion of cases in which the disease assumed this form. A certain number of patients were either found dead on admission or died shortly after admission and before a thorough examination of them could be made. Several of such patients had no buboes, and it is possible that some of them had died from the pneumonic form of the disease. In each of the twelve cases in which the diagnosis was certain there were no buboes. The other prominent symptoms of plague—the injection of the conjunctivæ, the coating of the tongue, the delirium and other nervous symptoms, the high temperature, rapid, weak pulse and the hot, dry skin—differed in no way from these symptoms as they are present in the more common bubonic form of the disease. But in all the patients there were prominent and characteristic symptoms which indicated, first, that there was some serious lung affection, and, second, that the illness was from the beginning one of a very grave character. The history in such cases was usually one of rapid onset, of rigors, high fever, difficulty in breathing, great prostration, and more or less cough and expectoration. On admission the temperature was usually very high, in many cases above 104° and in some above 105°. There was generally dyspnœa; in some cyanosis was present; in seven cases there was marked working of the alæ nasi. The cough was usually not very troublesome and the sputum was scanty. In some cases the sputum was more watery than that of ordinary croupous pneumonia, but in others it was distinctly tenacious, and appeared to differ in no respect from that of croupous pneumonia or of the secondary pneumonia of plague above described. The physical signs in these cases are those of one or more patches of pneumonic consolidation. Over the rest of the lung the respiratory sounds are usually accompanied by moist, bronchitic sounds.

The post-mortem appearances of the lung in such cases are very characteristic. There is usually some degree of pleurisy and an abnormal amount of fluid, which is often blood-stained, is present in the pleural cavities. The parietal and visceral layers of the pleura may show the mottled hemorrhages already described. On cutting into the lung the tissue between the pneumonic patches is generally deeply congested. Much bloody fluid, more or less frothy in character and occasionally containing a small quantity of pus, can be squeezed out of the lung. This part of the lung is generally crepitant, and appears to be in the condition of bronchial and vesicular catarrh, accompanied by a con-

siderable degree of congestion and sometimes of œdema. But the most characteristic appearances met with in the lung are those of the pneumonic patches. They may be single, or more often multiple, and vary in size from that of a pea up to large patches affecting a considerable portion of a lobe. They appear to be raised above the rest of the pleural surface, and usually differ somewhat in color from the non-pneumonic portion of the lung. On section the patch is sometimes seen to be distinctly triangular in shape, and a patch of this kind bears the closest possible resemblance to an embolic infarct. The larger patches are usually irregular in outline, and would appear to be, in many instances, due to the coalescence of two or more smaller patches. The patches are entirely devoid of air, and are, therefore, not crepitant; what little fluid can be pressed out of them is not frothy, and, if cut out, these portions of consolidated lung will be found to sink in water. The glands at the hilum of the lung are occasionally, but not invariably, somewhat larger than normal.

The pneumonic form of plague is in most epidemics the more fatal form of the disease. Of the twelve cases above referred to, however, two were fortunate enough to recover, though one of them had been very seriously ill, with a temperature over 105° and much delirium and prostration.

This form of plague is also usually regarded as the most infectious form of the disease; but, fortunately, the infection was not transmitted to any of the attendants from a single case. One hospital assistant wounded his finger in making a post-mortem examination upon one of the pneumonic cases; but he developed the bubonic form of plague, and not the pneumonic. An *ayah*, ward-boy, *mehter* (or sweeper), and a gardener employed in the compound of the hospital all contracted the disease, but they also suffered from the bubonic and not the pneumonic form.

The Genito-urinary System. In the acute stages of plague the urine has the characters common to all febrile urines—that is to say, it is deficient in quantity and more or less high-colored. As a rule, unless there is some degree of nephritis, the diminution in the quantity of urine is not very marked. A high degree of acidity is often met with in the urine of plague patients. Albuminuria is very commonly present, though not, as some writers have stated, universally so. Thus out of a group of seventy-five cases in which systematic notes were made of the condition of the urine, albumin was entirely absent throughout the illness in seventeen (or 22.7 per cent. of the whole group). It was present in the other fifty-eight cases. The degree of albuminuria varied greatly, from the merest trace of albumin up to an amount so great that the urine became almost solid on boiling. This symptom, in common with so many other of the symptoms of plague, underwent marked and more or less rapid changes. A patient's urine which con-

tained a considerable quantity of albumin one day would be quite free from it on the next or even on the afternoon of the same day, and *vice versa*. In some patients the albumin would appear, disappear, and reappear several times over in the course of the disease.

In a small number of patients the urine was found to contain a deposit of tube-casts, epithelia, and débris, indicating the presence of nephritis. The urine in such cases was high-colored and very scanty, and contained a large proportion of albumin and some blood. Complete suppression of urine did not occur in a single case, though in the nephritic cases the amount of urine was reduced to a very small quantity. In these cases the drowsiness, passing on into coma, so commonly present in plague, was unusually marked, and was doubtless in part due to the uræmic condition.

The passage of blood in the urine, apart from nephritis, is, in my experience, a rare occurrence in plague, and I have never seen it occur in an excessive degree. In two patients only was hæmaturia present without the urine containing tube-casts and other elements indicative of nephritis. Both patients were Hindoo male adults. Each had a left inguinal bubo. In one the temperature rose to 106° before death, and the urine contained a large quantity of albumin in addition to the blood. In the other case albumin was also present in a large amount, and in this case the blood and albumin continued to be present in the urine up to the time of the patient's death, on the third day after admission. In neither of these two cases did hemorrhage occur elsewhere.

In the following case the urine contained blood which apparently came from the bladder:

Case XII. (Register No. 935).—Mohammedan male, aged thirty-five years. The man was a confirmed opium eater; he had suffered from repeated attacks of malarial fever, and had in consequence a much enlarged spleen. He passed through an attack of plague of no great severity, accompanied by a bubo in the left femoral region, which did not suppurate, by a good deal of delirium, and by the presence on one day only of a light cloud of albumin in the urine. During convalescence (on the fourth day after his removal to the convalescent ward) the urine was found to contain blood in considerable quantity. I was away on sick leave at the time, and when I saw the patient, five days after the appearance of the blood in the urine, he was suffering from acute cystitis, with much pain and tenderness and frequency of micturition, and passing urine which was alkaline, and gave a thick deposit, made up of phosphates, red blood-corpuscles in large numbers, a few leucocytes, some irregular, flat epithelial scales with nuclei, and many very actively moving micrococci and rod-shaped bacilli. There were no tube-casts. The condition easily yielded to treatment, and two days later the urine was normal, save for the presence of a small number of red blood-corpuscles. The patient recovered.

Retention of urine is very common in plague. It has already been mentioned in discussing the symptoms connected with the nervous system.

Four women were admitted in the pregnant state, and all died. Three aborted before death—one at the fifth, one at the sixth month, and one at a period not noted. The fourth patient, who was pregnant four months, died without aborting, but the presence of an offensive vaginal discharge in her case probably indicated the death of the fœtus. The patient in this case was a young Hindoo, aged twenty years; she was stated to have been ill for fifteen days before admission, but the history of duration of illness in native patients must always be accepted with caution. She died on the fourth day after admission, without abortion occurring. Her temperature rose to 106.8° before death.

Four other women menstruated during the course of their illness—three died and one recovered.

THE HÆMOPŒIETIC SYSTEM. The *spleen* in plague patients is occasionally slightly enlarged; but it is rather important to point out that an enlarged spleen is in no sense whatever a necessary diagnostic sign of the disease. There would appear to be a somewhat general impression that enlargement of the spleen is an invariable accompaniment of plague, and that in its absence considerable hesitation is necessary in pronouncing a given case to be one of this disease. It will be recalled that in the case of Barisch, the laboratory assistant who developed plague in Vienna last autumn and who was treated in Prof. Nothnagel's clinic, both Prof. Nothnagel and Dr. Müller (who himself, unfortunately, succumbed to the disease later) "discountenanced the diagnosis of plague, as there was no enlargement of the spleen."[1] So far as my experience of the disease is concerned, enlargement of the spleen could be detected in only a small proportion of the cases. It is common to find the spleen after death from plague much congested and slightly larger than normal; but cases in which the degree of enlargement was sufficiently great to allow of its detection in life were comparatively few.

It has also to be remembered that native plague patients in India have, almost without exception, suffered at some period from an attack, or from repeated attacks, of some form of remittent or malarial fever; and that, therefore, in a considerable proportion of those patients in whom the spleen was enlarged the enlargement was in great part, if not entirely, due to this cause and not to the action of the plague virus. In a few patients of this kind I have met with spleens of immense size.

The spleen in uncomplicated plague cases usually has the appearances characteristic of that organ after death from acute febrile diseases. It is slightly swollen, full of blood, and frequently softened and more pulpy and friable than normal. But this is not invariably the case, and I have found the spleen in plague cadavers distinctly more hard and firm than normal. Hemorrhages under the capsule are not uncom-

[1] Lancet, October 29, 1898.

mon. In malarial subjects the spleen presents the appearances characteristic of ague-spleen.

The enlargement of one or more *lymphatic glands*, constituting a bubo or buboes, is, of course, one of the most frequent, and from a diagnostic point of view, most important of the signs of plague. It is absent in the primarily pneumonic form of the disease and also in a small number of other cases; but in my experience in non-pneumonic plague patients a bubo develops sooner or later in over 90 per cent. of the cases.

The gland or glands affected become swollen and tender, and there is practically no other constant character about them. The tenderness is, for diagnostic purposes, the more important feature of the two. In many plague patients, just as in patients suffering from any other disease, palpably enlarged glands may be met with, due to venereal disease or to some other known or unknown cause. It is sometimes a matter of considerable difficulty to determine whether a given swelling is truly a plague bubo or merely an old or chronic swelling due to one of these other causes. As there are many other febrile diseases which in their early stages closely resemble plague, the point becomes one of very great importance in the differential diagnosis of the malady. It is fortunate, therefore, that there is one character—namely, tenderness on pressure—which is almost invariably present in plague buboes, while it is almost invariably absent in chronic swellings due to other causes. The tenderness of a plague bubo is often excessive, the least touch of the skin over the swelling causing the patient to shrink and show signs of extreme pain. There is usually also a considerable amount of pain, apart from pressure, in a bubo. Pain or tenderness, or both, are generally very early symptoms, and often precede the swelling of the gland.

The other characteristics of a plague bubo vary almost infinitely. The skin over it may be somewhat reddened, but this is not usually the case. The skin may or may not be adherent to the gland beneath. There may be a great degree of surrounding infiltration masking the outline of the gland or glands enlarged. The swelling caused by the enlarged glands and the infiltration around varies greatly in size, shape, and consistency. It may be of almost any size—from that of a small potato up to the size of a fœtal head. Cervical buboes, in particular, sometimes develop into immense tumors, occupying both triangles of the neck and nearly filling up the angle between the neck and the shoulders. Large buboes of this kind are apt to be surrounded by a great degree of infiltration, which may extend for a considerable distance in all directions, both around and beneath the gland. In such cases the gland and infiltration around it may form a tumor of a peculiarly diffused character, and it may be impossible to define its limits or to tell where the infiltration ends and the healthy tissues begin. A diffuse swelling of this kind is frequently hard and brawny in character; occasionally it is soft and boggy, and pits on pressure. After

death the infiltration around a bubo appears to be of the nature of an inflammatory exudation; it has frequently a peculiarly gelatinous and glistening appearance, and contains much œdematous fluid, while in the large majority of cases it contains extravasated blood. The varying appearances of the hemorrhages around buboes were mentioned in discussing the circulatory system. Occasionally the infiltration around a bubo does not appear to be in any sense of an inflammatory character, but to consist entirely of extravasated blood.

In not a few cases there appears to be no infiltration of any kind around the bubo; the swelling is markedly hard and prominent, and the gland or glands can be felt and clearly outlined by the fingers; the skin in such cases sometimes appears peculiarly thin over the bubo, and the fingers may almost receive the impression that they are touching the very gland itself, with but the thinnest of coverings intervening between them and it.

Buboes are, as a rule, among the early manifestations of plague. Tenderness or swelling of a gland may be detected by the patient at the very onset of the disease, and in a few cases the patient will state that these symptoms were noted some time before the "initial" rigor and headache came on. In most bubonic cases the bubo appears within the first two or three days of illness; but this is not invariably the case, and in a few cases the appearance of the bubo is considerably delayed. In one patient under my care there was no sign of a bubo until the twelfth day after admission to the hospital, and in another the bubo only appeared on the fifteenth day. It is impossible to state with accuracy what days of the illness these represented, as the history of the disease obtainable from native plague patients or their friends is most unreliable. But if in these two cases the history obtained was correct, the dates of appearance of the buboes were the seventeenth and twenty-fourth days of the disease, respectively. The following are notes of four cases (including the two just mentioned) in which there was marked delay in the appearance of the primary bubo:

TABLE II.—EXAMPLES OF LATE APPEARANCE OF THE PRIMARY BUBO

| Register number. | Religion. | Sex. | Age. | Previous duration of illness in days. | Date of admission to hospital. | Date of appearance of primary bubo. | Position of bubo. | Number of days after admission when bubo appeared. | Day of illness when bubo appeared (approximate). | Result. |
|---|---|---|---|---|---|---|---|---|---|---|
| 647 | Hindoo | M. | 30 | 2 | Feb. 20 | Feb. 28 | Left popliteal. | 8 | 10th. | Cured. |
| 768 | Hindoo | M. | 30 | 9 | Mar. 3 | Mar. 18 | Right axilla. | 15 | 24th. | Cured. |
| 871 | Christian | M. | 46 | 3 | Mar. 15 | Mar. 20 | Submental. | 5 | 8th. | Died, Mar. 21 |
| 1049 | Hindoo | F. | 35 | 7 | Apr. 11 | Apr. 17 | Left groin. | 6 | 13th. | Cured. |

In patients who develop more than one bubo, the secondary bubo or buboes may appear at almost any period of the illness and at almost any interval after the appearance of the primary bubo. The following are some examples of late development of secondary buboes. In each case a primary bubo, in the position noted, was present when the patient was admitted, and the secondary buboes developed after the intervals noted in the table:

TABLE III.—EXAMPLES OF LATE APPEARANCE OF SECONDARY BUBOES.

| Register number. | Religion. | Sex. | Age. | Previous duration of illness in days. | Date of admission to hospital. | Position of primary bubo. | Position of secondary buboes. | No. of days after admission when secondary buboes appeared. | Day of illness when secondary buboes appeared (approximate). | Result and remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 638 | Hindoo | M. | 12 | 8 | Feb. 19 | Left axilla. | Submental. | 10 | 18th | Died, Mar. 1. Pleurisy and secondary pneumonia developed. |
| 651 | Christian. | M. | 25 | 3 | Feb. 21 | Left axilla. | Left cervical. | 3 | 6th | Died, Mar. 20. Erysipelas had set in on Mar. 16. |
| | | | | | | | Left groin. | 3 | 6th | |
| | | | | | | | Right groin. | 6 | 9th | |
| | | | | | | | Right cervical. | 6 | 9th | |
| | | | | | | | Submental. | 20 | 23d | |
| 741 | Hindoo | M. | 22 | 2 | Mar. 2 | Left axilla. | Left groin. | 6 | 8th | Recovered. |
| | | | | | | | Right axilla. | 8 | 10th | |
| | | | | | | | Right cervical. | 9 | 11th | |
| | | | | | | | Left supratrochlear | 22 | 24th | |
| 812 | Hindoo | M. | 21 | 3 | Mar. 6 | Right groin. | Right cervical. | 10 | 13th | Died, Mar. 24. (Vide Case XI. in the first article.) |
| 1118 | Christian (Goanese). | M. | 1½ | 2 | Apr. 18 | Left axilla. | Right femoral. | 6 | 8th | Recovered after diffuse suppuration spreading down left upper arm |
| 1140 | Hindoo | F. | 20 | 6 | Apr. 22 | Left groin. | Right and left cervical. | 8 | 14th | Recovered. |

The latest appearance of a bubo in any of the above cases was, it will be noted, on the twenty-second day after admission to the hospital; or, if the history was trustworthy, on the twenty-fourth day of the disease. The late development of a bubo, whether primary or secondary, is, like all late phenomena in the disease, a far from unfavorable sign. It implies that the patient has already survived the

earlier stages, and after the fourth or fifth day of an attack of plague every day survived lends stronger hope for the recovery of the patient.

In the majority of bubonic cases of plague which end in recovery the bubo suppurates. The character of the pus formed varies very greatly, both in quantity and appearance. Most often it is rather thick and contains sloughy and caseous fragments, and is not infrequently stained with blood. Sometimes it is thin and sanious in character. A not uncommon occurrence is the formation and discharge of a superficial collection of thin, sanious matter, apparently in the subcutaneous tissue over the gland, followed after an interval by the discharge of thick pus from the breaking down of the gland itself.

A not very rare sequel to a bubo is the formation of a deep slough, involving the whole bubo and the skin over it. A favorite position for this to occur is in buboes situated just below Poupart's ligament, at the base of Scarpa's triangle. The skin and gland or glands come away together as one deep, ragged, blackened slough. The slough usually takes three or four days or longer to separate. The cavity left behind may be four or five inches in diameter, and so deep that the vessels and fascia forming the floor of the triangle may be exposed. Usually the cavity has extremely ragged edges and floor; the edges may be considerably undermined. A good deal of dirty-looking pus lines the cavity. Such cavities usually heal; granulations slowly form, and the healing process is extremely gradual. In cases of this kind there is obvious risk of sloughing of the vessel walls, and dangerous and even fatal hemorrhage has been reported as occurring in more than one case. Fortunately, this did not happen in any of the cases under my care. This termination of a bubo in the formation and separation of a deep slough is not altogether an unfavorable sign, if only from the fact that it is usually a somewhat late phenomenon, and implies that the patient has survived the most dangerous stage of the disease. It causes, it is almost unnecessary to add, a considerable drain upon the patient's strength, particularly if, as sometimes happens, there is more than one sloughing bubo and other local lesions are present at the same time. But stimulant and nourishing treatment and appropriate local applications to hasten the separation of the slough and the healing of the cavity will usually lead to the recovery of the patient.

Buboes may occur in almost any situation in which there are lymphatic glands. The groin is, in my experience, the commonest position. Thus, out of 446 patients with buboes the primary bubo was in the groin in 268, or 60 per cent. of the total. The axilla was the next most frequent position (82 cases, or 18.3 per cent. of the total), and the neck occupied the third place in order of frequency, with 42 cases, or 9.4 per cent. of the total. The supratrochlear gland was primarily enlarged only in three cases, and the popliteal in two cases only; curi-

ously enough, in each of these five cases the bubo, whether supratrochlear or popliteal, was on the left side of the body. The submental gland was the site of the primary bubo in two cases. The position of the bubo is apparently not without influence upon the result of the disease. Cases with cervical or submental buboes have, in my experience, proved more fatal than others, and this is borne out by the evidence of other observers. Thus, of the 44 cases of this kind mentioned above, 37, or 84.1 per cent., died. Cases with axillary buboes occupied the second place in order of fatality, with a death-rate of 82.7 per cent. They were followed by cases with buboes in the groin (whether inguinal or femoral), in which the mortality was 80.1 per cent.; while among patients with multiple buboes the mortality was 79.2 per cent.

The figures here dealt with are somewhat small as a basis for general conclusions; but, so far as they go, they fully support the conclusions drawn from similar figures obtained from the experience of other hospitals, both in Bombay and elsewhere. It may now, indeed, be regarded as an established fact that cases of plague with cervical buboes are the most fatal; that those with axillary buboes come second, and those with groin buboes third; while those with multiple buboes are the least fatal. The explanation of the somewhat lower mortality of cases with multiple buboes has already been briefly referred to, the fact that there are several buboes in a given case implying that the patient has survived the first and most fatal period of the disease. The explanation of the higher mortality of cases with cervical and axillary buboes over those with groin buboes is not quite so obvious. It has been suggested that this higher mortality may be due to the greater proximity of buboes in the upper parts of the body, and particularly in the neck, to the brain centres, which may consequently be supposed to receive a larger quantity of toxins than when the bubo is at a greater distance. This explanation may very possibly be either entirely or in part correct; but it has seemed to me, in many cases at least, that the high mortality among patients with cervical buboes has been due to the excessively large size which buboes in this position may attain. Whether as the result of the loose nature of the tissues in the neck, which allows of a greater enlargement of glands in this position, or whether due to some peculiarity of the cervical glands themselves, which leads them to react more to the influence of the plague bacillus, there can be no question that glands in this position do attain a much greater size in plague than glands elsewhere. The exact relationship between the size of a bubo and the severity of an attack is not so entirely a simple matter as it would at first sight seem; but it would appear that in patients who survive long enough for the bubo to attain its full development the larger the bubo the more severe is the attack and the worse the prognosis. It is not known to what extent the degree of enlargement of a gland corresponds

to the quantity of toxins produced or to their degree of virulence. But it may, *à priori*, be assumed that, other things being equal, a large bubo will be capable of producing a greater quantity of toxins than a small one.

Very many patients die, in the course of the first few days of the illness, without the primary bubo attaining any great size; and such cases may be provisionally explained as due to the production in the bubo of toxins, not in large quantity, but of a high degree of virulence. In patients, on the other hand, who survive long enough for the bubo to attain its full development, the fact that the fatality of an attack of plague does bear a distinct relation to the size of the bubo can be best explained by supposing that the quantity of toxins produced varies with the size of the bubo. The greater size which cervical buboes may attain may consequently be regarded, with considerable probability, as in part the explanation of the higher mortality among patients with buboes in this position. An additional explanation is also found in the great importance to life of the structures in the neighborhood of cervical buboes. The larynx and trachea may be seriously pressed upon by the enlarged glands, or the surrounding œdema may extend to and invade these structures and cause dangerous and even fatal obstruction to the breathing. Swallowing, too, may be rendered almost or entirely impossible, and it may become a matter of extreme difficulty or impossibility to administer any nourishment by the mouth. All these conditions lessen the patient's chances of recovery.

To a less extent the argument just brought forward as to the relation between the size of the bubo and the severity of the attack in plague may also apply to cases with axillary buboes. Buboes in this position occasionally attain a very large size—larger than they ever attain in the groin—and this, in addition to the greater proximity of axillary buboes to the most vital organs, may be held to explain the somewhat higher mortality among patients with axillary than among those with inguinal buboes.

The relative mortality among cases in which the bubo is respectively on the right side or on the left side of the body may be referred to more as a matter of curious interest than as one having any very direct bearing on the many unsolved questions connected with plague. Among my own cases the mortality in patients with left-sided buboes was 83.5 per cent., and in those with right-sided buboes, 78.7 per cent. The difference is appreciable; but it can scarcely be regarded as anything more than accidental. Not only is there no obvious reason why one side of the body should be a more unfavorable site for a bubo than the other, but the experience just quoted has been exactly reversed elsewhere. This was notably the case in the very same hospital in the previous year's epidemic, when the mortality among patients with right-

sided buboes was considerably higher than among those with left-sided.[1]

There were 48 cases with multiple buboes. In 36 of these the buboes were in two positions, and in 8 of these (7 of whom, or 87.5 per cent., died) they were confined to the right side of the body; in 3 (all of whom died) they were confined to the left side; and in 25 (20 of whom, or 80 per cent., died) they were present on both sides. In 12 patients there were buboes in three or more positions, and of these 9, or 75 per cent., died.

It may be noted that every case in which the submental gland was enlarged, whether primarily (in two cases) or secondarily (in five cases), proved fatal.

Other Local Lesions in Plague. Apart from the buboes the external local manifestations of plague are of considerable variety, though a somewhat unnecessary degree of complexity has, I think, been given to them by some writers. The most important of these lesions can, in my experience, always be grouped under one of three headings: They are either collections of matter, or patches of necrosed skin, or blebs of watery fluid.

The collections of matter vary greatly in character and site. They may occur in almost any part of the body. The smaller ones have the characteristics either of a furuncle or of a pemphigoid bulla. Crops of boils or crops of bullæ may continue to appear for a long period after the acute symptoms of plague have passed off. They are most usually met with in patients who have had a very severe attack of the disease, and particularly in cases where the mental and other symptoms indicative of affection of the nervous system have been marked, and where the attack has left the patient in a more than usually weak and exhausted condition. I examined the contents of the boil or bulla in several instances, but never succeeded in obtaining the plague bacillus from them; while, on the other hand, pyogenic organisms were generally present in large numbers. The most probable explanation of their occurrence is, it seems to me, to be found in a lowered state of tissue nutrition, possibly accompanied by a lessened activity of phagocytes and a diminution in the quantity or quality of the alexins or protecting bodies, which allows of the entrance and multiplication of specific pyogenic organisms. If this is truly the explanation of these lesions they must be regarded as complications rather than as symptoms of plague. The contents are always purulent; but the pus varies in character. When the collection has the characters of a boil the

[1] Report on the Bubonic Plague in Bombay, by Brigadier-General W. F. Gatacre, C.B., D.S O. Bombay, 1897, p. 53. Report of the Parel Hospital, by Surgeon-Captain Thompson, I.M.S. Out of 304 cases, those with buboes on the *right* side gave a mortality of 66.7 per cent., and those with buboes on the *left* side only 58.3 per cent.

pus is sometimes thick and contains caseous and sloughy fragments, and may be mixed with blood; occasionally, but not very commonly, there is a hard central core, which separates as a slough. When, on the other hand, the collection has the characters of a bulla, the pus is often thin and serous, and the lesion closely resembles a bulla of pemphigus. There is always a greater or less degree of inflammatory areola around, and frequently a good deal of induration. When the pus escapes, either naturally or as the result of an incision, a small, ragged ulcer is left, which is slow in healing and leaves a permanent scar.

Occasionally a local collection of pus attains a very large size, and then it has the characters neither of a boil nor of a pemphigoid bulla, but of a large, superficial abscess. None of these lesions appears to me to be truly pyæmic. Were they of this nature abscesses would occur not only externally, but in the internal organs as well; and this I have not observed in a single case.

The second group of localized lesions take the form of patches of necrosis of the skin. In very many instances they are entirely artificial, as the result of the application, by the patient or his friends, of some irritant or caustic. In at least two-thirds of the cases of plague admitted to an Indian hospital it will be found that applications of this nature have been made, either over the bubo or elsewhere. They generally lead to destruction of the epidermis, but rarely affect the true skin to any depth; but patches of necrosed skin from other causes are also met with. They often develop remarkably rapidly, and the first stages may be easily missed. They appear to begin with a blackening and drying up of both the epidermis and the true skin, which come away as a thin slough, and leave a shallow, granulating plaque, which is slow to heal. They vary in size from that of a sixpence to that of the palm of the hand. When patches of this nature occur in positions liable to pressure, such as over the occipital protuberance, the sacrum, or the heel, it is reasonable to suppose that the pressure has been a factor in their production. In such cases they may be regarded as, and indeed have all the characters of, bed-sores; but they also appear not infrequently in positions not liable to pressure, and the most probable explanation of their occurrence here (as also, to some extent, of their occurrence in positions exposed to pressure) is that they are trophic lesions, due to a disturbance of that portion of the nervous system which controls and regulates the nutrition of the skin.

The third form of local lesion is a bleb or blebs which are occasionally found on some portion of the limbs of a patient suffering from plague. Between the fingers or between the toes is a favorite position for the appearance of blebs. They contain a small quantity of watery fluid with which a little pus may be mixed. They are extremely superficial, their outer wall appearing to consist of the raised epidermis only;

there is usually little or no inflammatory reaction around them. Most observers have regarded a bleb of this character as indicating the site of entrance of the plague bacillus. This view is a very tempting one; but, unfortunately, there are considerations of much cogency against its immediate and unqualified acceptance. Thus, in those cases of plague in man, where the site of inoculation is known, as in plague contracted by means of a wound received at a post-mortem examination, there is no reaction or formation of blebs at the site of entrance of the poison. The same is true where plague is artificially inoculated into rats or guinea-pigs in the laboratory. Moreover, blebs of this kind are not always an initial or a very early symptom, and I have seen them appear many days after the admission of a patient to the hospital and long after the other symptoms were fully developed. If they are in truth local reactions at the site of entrance of the plague bacillus it is at least remarkable that they are such comparatively rare phenomena, and that in some cases there are two or more such blebs present in the same individual.

In no instance have I seen the occurrence of anything in the nature of an exanthematous eruption in cases of plague. In one patient an urticarial rash appeared; but as this patient was one of fifty submitted to the injection of a serum for which curative powers were claimed,[1] the rash was almost certainly due to the action of the serum, and was not a manifestation of plague.

Conclusion. However desirable it might be to sum up in a few brief sentences the main characteristics of the disease, of which the clinical description here given, long though it be, is still far from complete, I have no intention of attempting to do so. The task would, indeed, prove an impossible one. No true conception of the nature of plague can be obtained without bearing in mind all the manifold phenomena which the disease gives rise to in every system and tissue of the body, and without remembering that these phenomena vary greatly, not only in different individuals, but in the same individual at different times. No other acute zymotic disease appears to cause such profound and wide-spread disturbance of function and even of structure, and few other diseases are so protean in character as plague, not only in its clinical manifestations, but also in its epidemiological behavior. The remarkable differences between the clinical pictures which may be presented by two given patients suffering from plague, or by the same patient on two successive days, find their exact analogue in the marked differences in the rapidity of spread, mortality, proportion of persons attacked, relation to climate, soil, altitude, and other concomitant conditions—in a word, in the epidemiological characters which may be presented by two given outbreaks of the disease.

[1] Lancet, May 6, 1899. "The Serum Treatment of Plague," by the author.

But in endeavoring to account for these differences the analogy between the two sets of phenomena to a great extent ceases to hold. As regards the behavior of the disease, as a whole, the greatest difficulty is met with in endeavoring to account for the very varying characters of different epidemics. To quote a single example, the recent severe recrudescence of the disease in Poona, in the middle of the monsoon, is entirely contrary to the behavior of the disease in previous years, whether in Poona or any other part of India. As regards the clinical phenomena of plague, on the other hand, a proximate explanation can, at least in many instances, be found for the varying features which the disease presents. The disease is unquestionably intimately connected with, if not solely caused by, the entrance into the body of a specific bacillus, and the subsequent production of specific toxins, which, circulating through the tissues, produce the varied general and local symptoms. The toxins appear to have an early and special action upon the brain and nervous structures through the body. There is also reason to suppose that muscle, glandular structures, and, perhaps, all other tissues in the organism, are to some extent affected directly by the action of the toxins circulating through them.

It is not always easy to determine to what extent each of these two modes of action of the toxins—indirectly through the nervous system or directly on the structures and tissues themselves—is to be credited in producing the effect. But there would appear to me to be little doubt that the toxins of plague are primarily nerve poisons, and that the affections of other organs or tissues met with in plague are to a very great extent, and, perhaps, to a greater extent than is usually thought, due to the profound disturbance of the nervous mechanism which controls their action or nutrition, or both.

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# A CRITICAL SUMMARY OF THE LITERATURE

## ON THE

## SURGERY OF THE STOMACH.

By Charles H. Frazier, M.D.,
of Philadelphia.

Such has been the activity of surgeons in this field that the reviewer can restrict his observations to the literature of the past year and yet find much that is worthy of attention. Of the many interesting features of the surgery of the stomach in this period especially noteworthy is the rapidly increasing popularity of operations, the object of which is to establish communication between the stomach and intestine, over those

which deal directly with the lesion of the pylorus. Discouraged perhaps with the results obtained from operative intervention upon the pylorus itself, or encouraged probably by the pleasing results following the anastomotic operation, where an attack upon the pylorus itself has been clearly contraindicated, whatever be the motive, surgeons are at all events discarding such operations as pyloroplasty, pylorectomy, or Loreta's operation in favor of gastro-enterostomy.

The explanation for this choice is not hard to find; the operation is not a difficult one; it meets all the indications for operative interference that arise from obstruction of the pylorus, except, perhaps, in those cases of pyloric carcinoma in which pylorectomy is possible; more than this, it has a salutary effect upon such lesions as are found in the stomach-wall secondary to obstructive disease of the pylorus; it precludes the possibility of a second operation, which may be necessary after a pyloroplasty or after pyloric dilatation; the technique has been so perfected that all the unpleasant effects, such as regurgitation of the bile, are now avoidable; the mortality has been so reduced that it may be regarded a safe procedure as compared with operations upon other portions of the digestive tract.

As to the method of its performance one must choose between a gastro-enterostomy alone or in connection with an entero-anastomosis or a gastrostomy. The added experience of the past year gives further assurance that the posterior operation is the operation of choice in every case. Among those who have contributed to the literature of the subject, practically all are united on this point, and favorable reports of cases operated upon by this method are constantly appearing. As regards the site at which the anastomosis should be established, there have been no new suggestions; the point selected should be the most dependent part of the stomach in order to insure thorough drainage. As regards the method by which the anastomosis is effected, the choice lies between the use of the Murphy button or some similar contrivance and simple suture.

In this connection we might refer to the discussion which has arisen as to the efficiency of the Podrez method. This method effects an anastomosis by the insertion of two sutures at right angles one to the other, through the entire thickness of both the stomach and intestinal wall; the necrosis of the constricted areas establishes the necessary communication between the stomach and jejunum. Warneck and Kisselew, in their experiments with this method upon dogs, failed in many instances to get the desired anastomosis. Podrez had already operated upon four cases, and was able in two to verify the efficiency of his method, while Sokaloff had, on the other hand, operated upon four cases, in two of which no anastomosis resulted, although the necessary conditions were observed. These results confirmed those in the experi-

ments of Warneck and Kisselew. Sokaloff stamps the method as unreliable, inasmuch as it is founded upon the supposition that all the layers of the stomach or intestine necrose simultaneously. Reichel proved the fallacy of this theory by showing that the serosa and muscularis resist pressure much longer than the mucosa, the latter undergoing necrosis sooner and thereby so loosening the ligature that it has no constricting effect upon the remaining coats. As pointed out by Sokaloff, this explanation accounts for those cases in which the ligature was found lying loose *in situ* in a cicatrix in the overlying mucosa. The observation of Sokaloff is a reasonable one, and, taken together with the failures attending the experiments upon dogs, furnishes sufficient grounds for a permanent objection to the method as originally described by Podrez. Trezbecky indorsed the Podrez method on account of its simplicity and on account of the time saved thereby in its performance; he advocated the modification of the technique, as recommended by Modlinski, of employing an elastic ligature, which would continue to constrict the layers until the entire thickness of the wall of the stomach or intestine was necrotic. Before adopting this modification he had operated upon a case of carcinoma of the pylorus with pronounced obstructive symptoms; fourteen days after the operation the patient died, and at the autopsy it was found that the ligature had only cut through the mucous membrane, the serosa and muscularis being intact.

While most of the mechanical devices for effecting anastomosis in the gastro-intestinal tract have been of American origin (Senn's plates and Murphy's button), yet these devices are more tenaciously clung to by the surgeons of Europe than by those of the United States. Working along this line, Baracz performed two gastro-enterostomies in which an anastomosis was carried out with aid of plates made of turnips; the plates were seven and a half centimetres long, two and a half broad, and two and a half millimetres thick, with an oval opening in the middle three centimetres long and three-quarters of a centimetre broad. These advantages were claimed by Baracz for his plates: less time is consumed in their introduction, and a broader serous surface is obtained than by other methods, thus insuring against perforative peritonitis. Baracz admits that the employment of these plates is better adapted to an anterior than a posterior gastro-enterostomy; and this of itself is a confession of its imperfection, since posterior gastro-enterostomy is the operation of choice.

Still looking for an improvement on the Senn plate or Murphy button, Martini conducted a series of experiments upon dogs in order to prove the efficiency of a cartilage plate. His operation was conducted in the following way: the plate, constructed of cartilage, was about one or two centimetres long, one-half to one centimetre broad,

and three to five millimetres thick. In the posterior wall of the stomach an oval incision two and a half to three centimetres at its widest point was made only through the serosa and muscularis, the mucosa being left intact. The plate was then secured in place by means of a number of sutures, running through the mucosa, the plate being perforated around the periphery for this purpose. After securing one such plate in place in the gastric and intestinal walls, the plates were brought into apposition and secured by silk sutures introduced through the muscularis and serosa. According to the results obtained it was noticed that in from thirty-six to forty-eight hours the mucous membrane was necrotic and the plates were free. On the third day communication between the stomach and intestines was established.

Apart from these suggestions as to the technique of affecting an anastomosis, certain modifications of this procedure have been recommended by various authors during the period under discussion. Ruthowski considers it of especial advantage to be able to resort to forced feeding immediately after the operation, and to this end he adopts the plan of combining gastro-enterostomy with gastrostomy, the tube being passed into the stomach and through the gastro-intestinal fistula into the jejunum. In support of this additional step it is claimed that it prolongs the operation but five minutes, places the stomach at rest, and allows of the immediate administration of food. The tube which prevents kinking of the gut or the formation of the spur is removed on the tenth day. Weitzel indorses this idea, and follows it up with a suggestion that the gastrostomy should precede rather than follow the gastro-enterostomy, on the ground that there is danger in the reverse order of the tube slipping out on reposition of the stomach. This operation Weitzel has called gastro-enterostomosis-externa.

As to the manner of inserting the Murphy button, T. W. Murray does this through a linear incision closed with uninterrupted sutures rather than by the purse-string suture. This prevents puckering of the walls of the stomach, which may interfere with union at some point. Carle and Fantino had already adopted a similar procedure; instead of relying on the purse-string suture a linear incision is made two-thirds as long as the diameter of the button, and through this incision on the stretch the button is introduced. One suture on either side usually suffices to secure the button in place.

Regarding the indications for the performance of gastro-enterostomy, they would seem to include practically all affections of the stomach in which operative intervention is indicated. As one might suppose, malignant pyloric stenosis is the indication in the large majority of cases. Of a series of thirty-eight cases that have been collected from

the literature of the year 1899, in twenty-one the cause of the stenosis was carcinoma; in the remaining seventeen the indications for operation included gastric ulcer, benign stenosis, congenital stenosis, gastritis, hour-glass contraction, gastroptosis, and motor insufficiency.

As regards the ultimate effect of gastro-enterostomy upon the stomach, Hartmann and Soupault made some interesting and valuable observations. They found that the stomach often regained its normal dimensions, in some cases quite rapidly, but more often in benign than in malignant cases. The restoration of the organ to its normal capacity seemed to depend upon the condition of the muscularis at the time of operation; thus if there was very pronounced atrophy, or if there was very extensive cancerous infiltration of the muscular layer, either of these conditions would retard or altogether arrest any tendency on the part of the stomach to regain its normal dimensions. Similar results might follow if a suitable coil of intestine had not been chosen, or if the anastomotic opening was not sufficiently large to insure of proper drainage.

It was noticed, too, that the motor disturbances subsided more or less rapidly, according to the duration of the stenosis or to the amount of atrophy, or, again, to the presence or absence of adhesions. The latter, if present, would frustrate any attempt at restoration.

Distinct changes in the character of the gastric secretion were noted. Thus the quantity might be very much diminished, once the obstruction be removed; this phenomenon is explained on the ground that the retention attending obstructive diseases of the pylorus stimulates the secretory function of the mucosa; once the obstruction is relieved the secretory glands of the mucosa become less active and at times undergo atrophy. Not only is the quantity of the gastric juice affected, but its reaction as well; the latter may be changed from a strongly acid to a neutral one, but, as a rule, it remains slightly acid. These changes were by no means constant, and in some cases no change at all was noted.

Not the least interesting were those observations upon the effect of regurgitation of bile. In not a few cases did this occur, and yet without any apparent disturbance of the digestive processes. Attention was called to the experiments of Masse, who established a fistula between the common duct and the stomach in order to determine the effect of bile upon digestion; after a series of observations he was unable to note any ill effects. We call attention to these results, because so much time and thought has been devoted to devising methods by which the regurgitation of bile could be prevented. This has resulted in the elaboration of more than one method that in this respect has given satisfaction. Among the functional results of these operations was noted the return

of the urine to normal, both as to quantity and quality, and the subsidence of the persistent constipation.

As a possible complication directly attributable to the operation, Braun's case is alluded to here. Eleven months after a gastro-enterostomy had been performed the patient, aged twenty-five years, was suddenly seized with signs of perforative peritonitis and died. The autopsy revealed a perforative ulcer of the jejunum, and Braun was of the opinion that the ulcer was an ulcus pepticum.

The mortality of this operation is steadily decreasing. Among the larger series from individual clinics which have been published is that of Kappeler, who records his experience with the operation from 1887 to 1898. Of thirty-nine operations, thirty-one of which were for carcinoma and eight for gastric ulcer, the mortality was about 30 per cent.—that is to say, of thirty-nine cases twenty-seven died within the thirty-day limit. These statistics are of little value to-day, because some of these operations were conducted before the technique had been so perfected and at a period when operation was performed only as a last resort.

Hartmann and Sopault have furnished us with the results in a series of twenty cases, including ten operations for carcinoma and five for gastric ulcer. Recovery ensued in every case upon the thirty-day limit.

The average duration of life was seven months. If to this series be added some eighteen isolated cases that have been collected during the past year, the mortality would be about 5.5 per cent.; for the malignant cases, 10.5 per cent., and for the non-malignant, *nil*. A comparison may be made between the mortality of the various procedures that were employed. Thus in malignant cases the simple gastro-enterostomy, anterior or posterior, was followed by a mortality of 12.5 per cent.; in non-malignant cases recovery ensued in every case. The Braun-Jaboulay modification was followed in each case by recovery, while the combination of gastro-enterostomy with a gastrostomy was equally successful. It is questionable whether sufficiently accurate statistics can be obtained from so small a number of cases to be of much value. They do, however, indicate a great decrease in the mortality of the operation, and compare very favorably with those of former years. In the sixty-six cases from Czerny's clinic during a period of thirty months preceding January, 1898, the mortality was 30.8 per cent.; in malignant disease, 38.3 per cent., and in other conditions 11 per cent. Compare these figures with those of a more modern series, such as that given above, and note the marked difference.

One could not review the literature of the past twelve months without being impressed with the abundance of material treating of the

advisability of surgical interference in gastric ulcer. The indications for this are not, however, as yet clearly defined; the whole subject is still subjudice, although the rapidly increasing experience of very recent times is bringing order out of chaos.

The situation seems to be this: In cases of acute perforation the necessity for immediate surgical intervention admits of no dispute. Great stress is to be laid upon the importance of an early operation, since the prognosis is good or bad in direct proportion to the time that has elapsed between the perforation and the operation. According to the most recent statistics, as furnished by Lund, the percentage of recoveries during the period 1897 and 1899, in cases operated upon during the first twelve hours, was 86 per cent., and within the first twenty-four hours 73 per cent. Comparing these statistics with those of earlier periods, a very pronounced improvement is noted. Thus, up to 1894 the percentage of recoveries was only 10 per cent., while up to 1897 it was 51 per cent. Richardson believes that the percentage of recoveries, as quoted above, is too high, because of the failure of operators to report their fatal cases.

The operation is not a difficult one in ordinary cases, but there may be occasions in which so many adhesions have formed as to make it difficult to expose or excise the ulcer. The incision should be in the median line in all cases in which there is any doubt as to the location of the ulcer; but where there is a reasonable certainty that it is situated at the cardiac end of the stomach, an incision may be made parallel to the costal cartilages. Once the abdominal cavity is opened, a systematic search should be carried out, according to the order of the frequency with which ulcers occupy one or the other of the regions of the stomach. Thus, 52 per cent. are on the anterior wall; 31 per cent. near the lesser curvature; 27 per cent. near the cardiac end; 13 per cent. near the pyloric end, and only 8 per cent. upon the posterior wall.

When the perforation is found it should be sewed with a single or double row of Lembert sutures, and, as a precaution against subsequent leakage, a small fragment of omentum may be engrafted over this line of sutures. While it is all important that the perforation should be closed, the operation is by no means completed until an attempt has been made in a thorough and systematic way to cleanse the peritoneum, which, in the majority of cases, will at the time of operation have been already infected. Fortunately, the presence of the adhesions will confine the area to a more or less limited space. Upon the extent of the area involved, and upon the virulence of the organism, will be based the prognosis.

The method of cleansing the peritoneal cavity here differs in no way from that employed in the presence of peritonitis of other origin, ex-

cepting, perhaps, in those cases in which the ulcer is situated upon the posterior wall of the stomach. Then it is necessary to open, drain thoroughly, and irrigate the lesser peritoneal cavity, paying especial attention to the region between the diaphragm and the liver—a region which is difficult of access, and yet one which is most apt to be contaminated, and, if neglected, to give rise to subphrenic abscess. In order to prevent such a complication, it has been suggested that the lesser peritoneal cavity be opened and inspected on all occasions.

Hemorrhage furnishes another indication for operation, not only repeated copious hemorrhages, but the frequent small hemorrhages associated with marked anæmia and dilatation of the stomach. The percentage of recoveries after operation in this class of cases is anything but satisfactory, more especially after copious hemorrhages. The mortality, according to different observers, varies from 60 to 70 per cent. As regards the propriety of operating to control hemorrhage, Mayo Robson, in his Hunterian Lectures, says: "I cannot help feeling that operative treatment in acute hemorrhage gives such a high rate of mortality (64.2 per cent. as compared with but 5 to 10 per cent. treated medically) that it is better in such cases to rely solely upon medical means. But in the repeated chronic hemorrhages that are responsible for quite half the total deaths from hæmatemesis, the operation of gastro-enterostomy affords a reliable method of treatment, since it at the same time gives rest to the stomach and removes the hyperacidity of the gastric juice, by an operation that can be done with rapidity and comparative safety. Moreover, when the ulceration is at the pylorus, where it so frequently leads to hypertrophy and stenosis, the operation not only relieves the symptoms for which it is undertaken, but proves curative to the disease." With these conclusions most surgeons will agree, while, at the same time, they recognize certain exceptions. Thus, in those cases where the hemorrhages are copious, frequent, and uncontrollable by medical means, the question of operative interference may be raised with perfect propriety. Once operation has been decided upon, the mode of procedure must be chosen from these methods: excision, ligation *en masse*, cauterization, ligation of the bleeding vessels, and, should the ulcer involve the pylorus, perhaps a pylorectomy. In the majority of cases excision of the ulcer or ligation will meet all the requirements; pylorectomy may be reserved for those cases in which the ulcer is situated on the pylorus; cauterization or ligation of the bleeding vessels is not radical enough to deserve consideration.

In cases of a more chronic type, where there is a history of small and repeated hemorrhages, inducing a grave anæmia, operative interference gives very great satisfaction; and the operation of choice is, for reasons already mentioned, gastro-enterostomy.

There remains to be considered those cases of gastric ulcer in which pain and vomiting persist in spite of medical treatment. Here operation is rather one of choice than of necessity, and it must be left to the judgment of the attending surgeon whether the symptoms are severe enough to demand the use of the knife. In this connection the surgeon may be guided by the results of Greenough and Joslyn's investigation as to the condition of a series of cases five years after their discharge from the hospital. Of one hundred and fourteen cases treated at the Massachusetts General Hospital, but 40 per cent. had remained well at the end of five years, whereas 80 per cent. had been previously discharged as cured or relieved. Thus the failure to effect a permanent cure was 60 per cent., while the mortality was 20 per cent. Comparing this with the low mortality of gastro-enterostomy carried out in the absence of peritonitis, one sees at once the propriety at least of giving very serious consideration to operative interference.

Little if anything has been accomplished during the past year toward the perfection of the technique of gastrostomy. The operations which command the greatest confidence are those of Kader and Marwedel, both of which were described in 1896. The most recent work upon this subject is a monograph by J. Braquehaye. It treats, first, of the indications for this operation, which are divided into three classes: those in which the obstruction is non-malignant; those in which it is malignant, and those in which neither of these factors play a part, the latter class including partial absence of the œsophagus, or congenital malformation, tracheo-œsophageal fistula, diverticula, and pressure of a tumor. As to the variety of operations they may be subdivided into four classes: 1. Those in which the operation is performed at two sittings. 2. Those in which the closure of the stomach is maintained by a sphincter-like action. 3. Those in which closure is maintained by a valvular action. 4. Those in which a combination of the valvular and sphincter-like action is employed.

Surgeons at large give the preference to those procedures which depend for their efficiency upon a valvular action, and of these the best are those of Marwedel and Kader. These operations are the ones which can be carried out the most rapidly—and time is always an important consideration in these cases, since the patients are at the time of operation more or less cachectic. Marwedel's operation differs from Kader's in that in the former the tube is passed through an oblique track into the stomach-wall, while in the latter it passes directly into the stomach through a funnel-like process. In its present stage of perfection there is practically no danger of leakage into the peritoneal cavity after gastrostomy. There is scarcely any chance of the stomach contents escaping through the external wound, and but little likelihood

of subsequent contraction of the newly-formed fistula. Keen says that the mortality of this operation in the most difficult cases would not be higher than 10 per cent., and, to quote Mayo Robson, "It would not be an exaggeration to say that if cases of incurable stricture of the œsophagus or of obstructive cancer of the cardiac end of the stomach were handed over to the surgeon at a sufficiently early stage the mortality would not exceed from 5 to 10 per cent."

As regards the time at which operation should be performed in malignant stenosis of the cardiac end of the stomach, it is all important that this should be done once the diagnosis is made—that is, without regard to the degree of dysphagia. The advantages of an early operation are these: it allows of the patient receiving sufficient nourishment, and by putting the œsophagus at rest it does away with the mechanical irritation, retards the progress of the growth, and thereby prolongs life. As to the duration of life after this operation, one case has been reported in which the patient survived for a period of four hundred and two days. In non-malignant cases the longest period for which the patient has survived the operation is sixteen years.

To sum the matter up it might be said that the operation of gastrostomy, as performed to-day, is almost ideal. In none but the more difficult cases—those in which carcinoma is of long standing and the cachexia profound—should there be any appreciable mortality. The immediate benefits derived from placing the patient upon a sufficient diet, and thereby improving the general nutrition, are most pronounced. The subjective annoyance to the patient of the presence of a gastric fistula is practically *nil*. From the stand-point of the surgeon the operation is equally satisfactory, not only on account of its safety, but also on account of its simplicity and ease of execution.

Three years ago Schlatter, of Zurich, startled the medical world with an announcement of his sensational operation. Connor, of Cincinnati, had already made an attempt to remove the entire stomach, but his patient died upon the table. From the time of Schlatter's operation up to the present but eight additional cases have been reported with such results as will be seen presently. The history of the entire series may be told in a few words. Schlatter's case was operated upon September 6, 1897, and died October 29, 1898, about fourteen months later. At the autopsy evidences of metastasis were found in the mesenteric, retroperitoneal, bronchial, and supraclavicular lymph-glands, and in the pleura. That the death of the patient was not due to impoverished nutrition but to carcinomatosis seemed to be borne out by the records of the case from the time of the operation until death. This would seem to teach the physiologist that human life cannot only be sustained but that the individual can gain in weight from the assimilation of food solely by the intestinal tract.

On February 24, 1898, Charles B. Brigham, of San Francisco, operated upon a patient sixty-six years of age, uniting the œsophagus to the duodenum by the Murphy button. The latest report of his patient's condition was published early in February of this year, practically two years since the operation was performed. She is able to do general housework, her diet requires no particular restriction, and she eats three hearty meals a day. Since the spring of 1899 she has gained in weight. The Murphy button has never been passed; and a skiagraph taken on January 12, 1900, demonstrated it lying a little to the left of the spine, at the level of the eleventh dorsal vertebra. At present there is no evidence of metastasis; the blood count shows no leucocytosis.

Delatour (May 2, 1898) removed the entire stomach from a woman, aged twenty-six years, the growth being adenocarcinoma. She reacted well, had gained thirty pounds at the end of six months, and seventeen months after the operation her condition was reported as being excellent.

On May 31, 1898, M. H. Richardson, of Boston, performed the fifth total gastrectomy. In November the wound reopened and began to discharge, and in February, 1899, the patient died of intestinal obstruction, due to extensive dissemination of carcinoma. The autopsy revealed most extensive cancerous infiltration, involving the abdominal wall and intestines alike, with evidence of general carcinomatosis. Richardson draws the following conclusions from this case: The patient's health would have been fully re-established had there been no recurrence; the subsequent sufferings of the patient were due rather to the mechanical effects than to the cancer itself; œsophago-duodenotomy is technically possible in a certain number of cases; the experience gained in this case encourages rather than forbids further attempts in the surgical treatment of gastric cancer. Comparing the history of other cases that have not been subjected to operation with those that did undergo that procedure, Richardson believes the suffering of the former class to be much more intense, while those patients have not had the satisfaction of knowing that they had accepted the one chance for recovery.

Four months later (September, 1898) G. C. MacDonald, of San Francisco, operated upon a male patient, and met with the same success as his fellow-townsman. At the last report, some eighteen months later, his patient was in excellent condition, was doing the work of a farm laborer, eating all kinds of meats and vegetables, and suffering no inconvenience therefrom. MacDonald lays stress upon the importance of the proper selection of cases and upon the necessity of securing perfect coaptation at the point of anastomosis.

T. F. Chavasse reported, in the *Transactions of the Pathological Society of London*, vol. l., the sixth case. This case and those of W. H. Kobb

(death on the table) and A. C. Bernays (death in thirty-six hours) comprise the three fatal cases in this series of eight.

John B. Harris, of Troy, reports the fourth successful case. In May, 1899, the operation was performed. The patient, a woman, aged forty-six years, was discharged from the hospital June 15, 1899, after a meal of roast beef and mashed potatoes, having in that short time gained about twenty pounds. The anastomosis was effected without difficulty by a double row of sutures.

Excluding the operation of Connor, which was carried out before the technique of abdominal surgery had begun to attain its present state of perfection, there have been reported nine cases of total or complete gastrectomy. Of these, four are still living; two died, fourteen and seven months after the operation, respectively, and the remaining three died upon the table or within thirty-six hours. The mortality of this series is 33 per cent. Certainly, it must be admitted that the operation has a field—to be sure, a limited one—in the surgery of the stomach. Face to face with these results, the operation cannot be branded as impracticable or as unjustifiable. The lesson to be learned from the experience which these few surgeons have had seems to be this: that, given a patient in fairly good health, with a carcinoma which has not grown beyond the confines of the stomach, it is perfectly feasible and practicable to extirpate this organ completely and to effect a perfect anastomosis between the œsophagus and the duodenum, with or without the aid of the Murphy button; that, providing metastasis has not already occurred, the patient may entirely regain his or her health, and will then be able to ingest and assimilate food of the same quality and almost in the same quantity as before the operation; that the process of metabolism seems in no way disturbed so far as the patient's health is concerned. In both the patients that survived the shock of the operation, but died some months later, the records would seem to prove that death was not due to impoverished nutrition but to the results of metastasis. Indirectly, the lesson to be learned is the importance of an early diagnosis—one established, if necessary, by the aid of an exploratory operation—not delaying for its confirmation until the tumor can be felt through the abdominal wall, for the time for operation will then often have passed. Richardson says: "Cancer of the stomach, if extirpated in its earliest stages, offers as good a chance of recovery as cancer of the uterus."

It would not be amiss to refer at this juncture to a partial gastrectomy carried out by F. V. Cantwell upon a woman, aged fifty-two years. A sarcoma, arising from the posterior wall of the stomach, and weighing twelve pounds, was removed. The patient recovered from the operation, but there was evidence of very rapid recurrence within

six months. As to the technique, the divided portions of the stomach were united with two layers of sutures, one a continuous, the other a mattress suture, and these together rendered the wound absolutely water-tight. Mayo Robson has collected fourteen cases of partial gastrectomy in which at least three-fourths of the stomach had been removed for cancer. Of this series the mortality was 28.5 per cent.

When we have reviewed the literature pertaining to gastro-enterostomy, gastrostomy, gastrectomy, and the operative treatment of gastric ulcer we have covered the greater part of the field in which there has been any activity during the past year. As gastro-enterostomy is growing more and more in favor, so pyloroplasty and Loreta's operation seem to be sinking into disfavor. As has been pointed out, the results following gastro-enterostomy are so much more apt to be permanent than are the results of pyloroplasty or Loreta's operation, and the beneficial effects upon the pathological conditions existing in the stomach at the time of operation are so much more pronounced, we can readily understand why so little attention is paid to those operations which deal directly with the pylorus.

The method of treating dilatation of the stomach by gastroplication has received some attention during the past year. The operation consists in raising the lowered greater curvature of the anterior wall of the stomach, folding it upon itself, and fixing it in position by two rows of sutures.

In glancing over the various methods that have been adopted in the treatment of carcinoma of the pylorus, one is at once struck with the small number of pylorectomies that have been recorded of late. Not only have few such operations been performed, but also very little attention seems to have been paid to this subject in recent treatises upon the surgery of the stomach. This may be due to the fact that patients do not submit to operative interference until such adhesions have formed around the pyloric growth as to make its complete removal impossible.

A review of the literature of the surgery of the stomach would not be complete without referring to a work published in 1899 by Terrier and Hartmann (*Chirurgie de l'Estomac*). There is no other book that treats of this subject in such a comprehensive and modern way. The individual operations are well described and splendidly illustrated, so that as a work of reference, especially in regard to operative technique, it is invaluable. As an indication of the relative importance of the various operative procedures described, we find about three hundred pages devoted to gastrostomy, gastrectomy, and gastro-enterostomy, while the balance of the book, including some fifty pages, embraces all that has to be said of excision and dilatation of the pylorus, pyloroplasty, gastrorrhaphy, and gastropexy.

# REVIEWS.

I. The Gross and Minute Anatomy of the Central Nervous System. By H. C. Gordinier, A.M., M.D., Professor of Physiology and of the Anatomy of the Nervous System in the Albany Medical College; Member of the American Neurological Association. With 48 full-page plates and 213 other illustrations, many of which are printed in colors, a large number being from original sources. 8vo. Philadelphia: P. Blakiston's Son & Co., 1899.

II. The Nervous System and its Constituent Neurons. Designed for the Use of Practitioners of Medicine and of Students of Medicine and Psychology. By Lewellys F. Barker, M.B., Tor., Associate Professor of Anatomy in the Johns Hopkins University and Assistant Resident Pathologist to the Johns Hopkins Hospital. With two colored plates and 676 illustrations. New York: D. Appleton & Co., 1899.

III. The Anatomy of the Central Nervous System of Man and of Vertebrates in General. By Ludwig Edinger, M.D. Translated from the fifth German edition by Winfield S. Hall, Ph.D., M.D., assisted by Philo Leon Holland, M.D., and Edward P. Carlton, B.S. Illustrated with 258 engravings. Philadelphia: The F. A. Davis Company, 1899.

In spite of the enormous amount of work that has been devoted to the central nervous system in man, we are still far from any adequate knowledge of its structure and functions. This is the result of the extreme complexity of the structure and the impossibility of devising any adequate experiments which will enable us to study the functions of the sensory neurons or the way in which certain portions of the brain act upon other portions—that is to say, the functions of the endogenic neurons. Various methods of arriving at a clear understanding of the central nervous system have been devised, each of which is vaunted by its particular school, although, of course, no leader in this branch has ever been satisfied to pursue one method to the exclusion of all the others. The most obvious method is direct observation, and it was practically the only method pursued by the older anatomists, and was, moreover, the method that produced such magnificent results in the hands of Stilling. Next in course of time was the study of the effects of pathological lesions, and from this naturally arose the experimental work upon the lower animals in the attempt to elucidate some of the problems of human cerebral anatomy. At the same time it occurred to another class of students that comparison of the human brain with the brains of the lower animals, particularly if the latter were studied in the order of their development from the lowest to the

almost human type of the anthropoid apes, would yield valuable information, and finally Flechsig has added greatly to our knowledge by his method of studying the periods at which the different groups of fibres in the central nervous system assume their myelin sheaths; but all these methods give us merely an idea of the grosser features. Microscopical technique, however, has advanced so greatly with the discovery of various methods of staining that we are able nowadays to study very minutely the anatomy of the individual nerve-cells. How much has been added to the knowledge that was gained, or that could have been gained, by the old carmine stain it is useless to discuss. Even the Golgi method of impregnation, beautiful as it is and wonderful as its results have been in the hands of such masters as Golgi himself, Cajal, Kölliker, and Lenhossek, has added only a few really new things to our knowledge. That these things are of paramount importance must be admitted. The method of Nissl, in spite of the elaborate terminology that its inventor has devised, has added but little to our knowledge of the normal anatomy of the cells, for the tigroid bodies can be seen with hæmatoxylin, and the outlines of the cell are shown no more clearly than with carmine. The revelation of more minute features is claimed for the complicated methods of Apathy and for the as yet unpublished method of Bethe. To these methods we owe our modern conception of the neuron theory, especially to that of Golgi. According to this theory, the nervous system is composed of a series of units, each of which consists of a nerve-cell, its dendritic or branching processes, and its axis-cylinder—also a branching process, but somewhat different in character. The cell is usually an irregular or round body containing a nucleus, a nucleolus, and in the protoplasm of some of these cells there are small masses of granules that take the basic aniline stains. The dendritic processes usually branch freely, becoming smaller and terminating in a fine network of fibres provided with little lateral buds or gemmules, which do not, however, as far as we have been able to determine, come in contact with any part of any other neuron. The axis-cylinder is a long, slender process of equal calibre throughout that gives off from time to time yet more slender lateral processes—the collaterals—and that terminates in various ways, either in a fine tuft of fibres that are placed in close relation to the protoplasmic processes of another cell, or in some special peripheral sensory area, or in a muscle plate. We know something of the apparent function of these three elements. The axis-cylinder is certainly a path for the conduction of nervous impulses from the ganglion cell to its termination; the cell body probably generates these impulses or modifies others that it receives, maintaining at the same time a trophic influence over the whole neuron, so that when it is destroyed its processes degenerate. In some of the lower animals it is possible that the neurofil, or network of dendrites and collaterals, is capable of an existence independent of the presence of the ganglion cell. Regarding the functions of the dendritic processes, we are at present in doubt. According to some authors, particularly Lenhossek, they are cellulipetal organs conveying impulses from their peripheral terminations to the cell—a theory that is favored by the presence near their terminations of the terminal fibrilla of the axis-cylinder that forms part of their chain. Lenhossek even believes that certain nerve fibres conveying impulses to the ganglion cells of the spinal cord are nothing but modified dendritic processes. Other writers, however, chiefly be-

cause of their resemblance in form to the branches or roots of a tree, have supposed that they have a nutritive function and represent merely a mechanical extension of the protoplasm of the cell, so that it becomes capable of presenting a greater surface to the nutritive fluids that surround it. In favor of this view is the fact that the substance of the dendritic processes, at least of the main trunks, is very similar in structure and staining reactions to the substance of the protoplasm of the cell itself, and, further, that frequently a particularly stout protoplasmic process can be seen extending from the cell to some adjacent blood-vessel. Now, the central nervous system is, as a matter of fact, composed practically of nothing but these neurons embedded in a mass of fibrous connective tissue that is derived from the epithelial layers of the embryo, and is called neuroglia. It has been found that, in general, neurons having the same functions or influences over certain local areas in the body are placed close together—that is, in groups or bundles. It has been customary, therefore, in studying the anatomy of the nervous system, to regard it as made up of groups of ganglion cells, or, as they are commonly and confusingly termed, nuclei, which are composed of the cellular elements of neurons with similar functions, and of bundles of nerve fibres or tracts which are composed of the axis-cylinders that proceed from these nuclei to the point where the impulses that they generate are supposed to act. The nuclei are aggregations of cells and can usually be studied directly—that is, they occur in groups, and all the cells in these groups can readily be stained. The presence, however, of numerous nuclei close together, or their overlapping, often renders it difficult to determine the limits of each one. The course of the fibres is traced with more difficulty, and various methods have been resorted to for the detection of the situations of these tracts and their termination. Of these, three methods are most important: First, direct observation, certain bands of fibres being separated from their surroundings and recognized as such without, or sometimes with, preparation; second, the study of degenerated fibres, staining recent degenerations by the Marchi method, those of older date by the Weigert method; and third, the method of Flechsig, or the study of the embryonal development of the fibres. We have at least learned from these that the neurons are arranged in chains, thus, in the motor tract one neuron passes from the cortex to the spinal cord, and where it terminates another passes out along the peripheral nerves to a muscle in the sensory chain. The sensory fibre passes from the periphery to the ganglion cell, which also sends out a fibre that enters the spinal cord, and comes into relation either there or in the medulla with the secondary neurons, which also terminate in all likelihood in the basal ganglia, where the third neuron conveys the impulse to the cortex. As direct contact has not certainly been observed, various theories have been suggested to explain how the nervous impulse passes from the termination of the axis-cylinder of one neuron to the ganglion cell of the next in the chain. It has been supposed that the dendritic processes are capable of movement, and that they form actual contact with the fibres from the axis-cylinder, or that without direct contact an impulse may be set up in one cell by the activity of the nervous impulse in another by a sort of induction. A difficulty of this theory, which does not seem to have occurred to most of its advocates, is that supposing we admit the neuron to be an independent unit, there is no route provided for the return of the nervous impulse to the cell

that generated it, unless we can imagine it passing back up the axis-cylinder—a movement that there is no reason to believe occurs. Apathy, whose results have been more or less accepted by Bethe and Nissl, has found by special methods of staining, minute fibrils in the nerve cell, that pass out by the protoplasmic processes and into other nerve cells, thus forming contact throughout the entire nervous system. His work, however, on account of the extreme complexity of the methods employed, has not as yet been sufficiently confirmed. At any rate, the transmission of impulses from one neuron to another certainly does occur, and it makes little difference, as far as the functional result is concerned, just how it is brought about.

Until very recently the anatomy of the central nervous system was neglected by systematic general writers, and the English reader was driven to translations from the German or to text-books of anatomy. It is true that in one of these text-books (Quain's) the article written by Schaeffer is quite equal in excellence to anything that has been done in any other language, but no separate book existed. This deficiency has been overcome recently.

Gordinier has provided a most excellent practical work, profusely illustrated with plates and inserted figures. The book professes to be merely a text-book of the subject, written primarily for the student and adapted to his needs. It commences, therefore, as is customary in such books, with a description of the histology of the nervous system, then takes up the spinal cord, the cerebellum, and the various regions of the brain. The work concludes with a description of the histology of the cortex, the course as far as known of the fibres in the centrum ovale, and has chapters on the bloodvessels, on cerebral localization, on the embryology of the brain, and on the macroscopical and microscopical technique. The book does not pretend to contain any strikingly original matter, but does aim to present what is known on the subject clearly and logically. In this we believe the author has fairly succeeded: the style is lucid, the illustrations are well chosen, and in general well printed. There are certain features of the book that we perhaps are not altogether unjustified in pointing out. We think the book is larger than is necessary, and this excessive size is due to the large type, generously leaded, that is employed for the text. It is not really easier to read large type than reasonably small type that is clear, and this makes the book heavier and more clumsy. Many parts could have been printed in small type without any impairment to the value of the book, and this would also have served to reduce the size, particularly those parts relating to microscopical and post-mortem technique. Another factor that is not altogether praiseworthy is the repetition of plates with separate numbers. Of course, as a matter of fact, there are forty-eight plates in the book, but they are by no means all different. These, after all, are all very minor matters. A more serious fault is the almost total neglect of the literature of the subject, references being introduced in the rarest instances, although the author must have known that his excellent book would find a much wider circle of readers than that bounded by the walls of the class-room.

Barker's book is an ambitious effort to present the material now accumulated concerning the anatomy of the brain and cord within the limits of a single book, and always with strict reference to the neuron

theory. The book consists of over 1100 pages, to which some plates with letter-press are appended. It is divided into various sections, profusely and excellently illustrated, and the arrangement is logical. Abundant use has been made of the literature of the subject, which has been read thoroughly and intelligently and abstracted with careful fairness. If we may be permitted to point out certain features that to us appear to be defects, possibly merely those incident to a first edition, we would like to speak first of the length of the book. It is at least twice as long as seems necessary, the style is diffuse, and some material has been introduced that is not altogether relevant to the subject, although in some instances it is quite interesting. Thus, on page 31, there is a panegyric upon Ehrlich's work, that, brief though it is, might have been omitted without injury. There are also numerous repetitions, and some things are stated as certain concerning which a few of us entertain what we believe to be as yet a not altogether unreasonable skepticism, particularly, for instance, in regard to the direct dendritic processes of the cells. Neither do we agree with Barker's conclusion that if certain anastomosis between the terminations of the axis-cylinders and the dendrites, for which no anatomical relations indicating conduction can be discovered, are assumed to have no nervous functions, then we are obliged to admit that the transferrence of impulses from one neuron to another may be the sum total of the nervous functions. After criticising the length it will appear ungracious, perhaps, to suggest that anything might have been added, but it would have been delightful to have had Barker describe for us in his clear manner the marginal veil theory of His, which is barely mentioned. There are two or three little defects of arrangement that we may also notice. In a few of the illustrations the letters appended to the figures are explained only in the text and not in the legend. It is our belief that this should never be the case. The table of contents, for some inexplicable reason, is divided into two parts, the second part being placed in the body of the book. There is not really sufficient distinction between the two parts to justify this, and it is more than inconvenient. The excellences of Barker's work are numerous. A more thorough review of the literature of the subject has probably never been made, and perhaps could not have been made by a man who had devoted his life to this branch or who had a theory to defend, for then his opinions could not have escaped the influence of the personal equation. Not that we mean that Barker has made no investigations of his own, for it is very evident that he has made many; but we think it just to say that the new knowledge concerning the anatomy of the central nervous system that appears in this work is practically negligible. The illustrations are often really luminous; many of them are original, and some of these are of extraordinary value, particularly the horizontal sections through the pons and medulla of a new-born babe, prepared by Dr. Hewetson. The diagrams of the relations of the nuclei in the brain, as projected upon a plane surface by Miss Sabin, are also valuable, but, of course, only to one who has worked with the actual specimens. Many of the subjects are discussed in a masterly manner. We think perhaps that the description of the structure of the posterior columns of the cord and of the course of the fibres entering by the posterior roots is one of the best features of the book, but among so many excellent features it is difficult to choose. Popular subjects, such as cerebral localization,

or the discussion of the relations of morphology to psychology are only incidentally mentioned. The neurologist will, of course, find in it much that is of value to him, but he will be obliged to search for it carefully. On the whole, America is to be congratulated for having produced what is probably the most complete work in the English language upon the anatomy of the brain.

Edinger's book is practically a new work, although it is called a fifth edition. The industrious author has introduced a second part, in which he reviews the embryology and the comparative anatomy of the vertebrate brain, studying each portion of the brain through the whole vertebrate kingdom up to man. This is the most complete and masterly treatise upon this important subject that has hitherto appeared, although, if we are to believe rumor, a more thorough work is now in course of preparation. It is hardly necessary to make any criticism of Edinger's book. It is a book not for the beginner, but for the specialist. The treatment of the subject is all technical, and the mass of information at Edinger's disposal is too vast to allow him to present a text-book for beginners. In order to keep his work within the bounds of a series of lectures he is obliged to hint at many subjects which to him are clear, but to the rest of us, unfortunately, are not so comprehensible. The book is of considerable value to the general reader, for in it are introduced discussions of various popular subjects, particularly the relation of the brain to the mind. Edinger has little hesitation in locating the highest psychic functions in the cortex of the brain. He gives a very interesting and valuable *résumé* of our knowledge of the relation of the enlargement of certain parts of the brain to certain varieties of intelligence, but reaches the lame and impotent conclusion that in regard to this subject we are still obliged to devote ourselves to the collection of data and not to the discussion of it. The translation in general is excellent. There is a slight flavor of the original German that is not altogether distasteful to those already acquainted with the language, such as the phrase "by the numerous already decussated." Occasionally a word is misused or not used according to the English idiom; thus, the spinal cord is sometimes spoken of as the "spinal marrow, now nearly obsolete." On page 127 the epiphysis is called an "impaired" organ, and although this is literally correct, we suspect that "unpaired" would have been nearer the meaning Edinger intended to convey. The book is carefully printed; the illustrations are almost equal to those in the German edition, having suffered but little in the transferrence. It is the smallest of these three books, and yet we cannot help feeling after perusal that it contains the greatest amount of important material. The third part shows no essential change from that of the preceding edition.

J. S.

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CHIRURGIE DU RECTUM. Par E. QUÉNU et H. HARTMANN. Tome II. Tumeurs du Rectum. 8vo., pp. 384, avec 74 figures et 28 planches hors texte. Paris: G. Steinheil, 1899.

THIS handsome work is a second volume of the elaborate treatise on rectal surgery being written by the authors. The previous volume, published about five years ago, took up the consideration of the anatomy

and other preliminary matters, as well as inflammations of the rectum. This volume discusses rectal tumors, and does so in an exceedingly satisfactory manner. As would be expected, a great deal of attention is given to the histology of these morbid growths.

The microscopical illustrations, many of which are colored, are very beautiful. There are also a great many plates showing the macroscopical appearance of the varieties of rectal disease; a considerable number also of these plates are colored. More than half of the book is occupied with a consideration of rectal cancer. The various methods of removing the diseased portion of the bowel are described. The authors advocate a combined abdominal and perineal operation, by which a thorough eradication of the diseased organ is made possible.

The authors divide rectal tumors into those of epithelial type, those of connective tissue type, and those of the muscular type. They then devote a short chapter to certain growths observed in the rectum, but which they think are scarcely properly included in the category of true tumors. These are angiomas, dermoid cysts, and some teratomas. They do not consider hemorrhoidal disease as properly belonging to the group called angiomas, hence hemorrhoids are not discussed in this volume. A limited number of cases are quoted in order to illustrate the statements of the writers, but the book is not overloaded with clinical histories.

The fine paper and the excellent manner in which the printer's work has been done make the book very agreeable to the eye. The scientific value of its chapters and the bibliographical references contained in the foot-notes will give it a permanent place in surgical literature. It is destined to be frequently referred to by those interested in the surgery of the lower bowel. J. B. R.

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TRAITÉ DE CHIRURGIE CLINIQUE ET OPÉRATOIRE, publié sous la direction de MM. A. LE DENTU et PIERRE DELBET. Tome huitième. Mésentère, Pancréas, Rate, Foie et Voies Biliaires, Anus et Rectum, Rein, et Uretère, avec 123 figures. 8vo., pp. 972. Paris: J. B. Bailière et fils, 1899.

THE eighth volume of this comprehensive treatise, which will consist of ten volumes, discusses the surgical affections of the mesentery, pancreas, spleen, liver, anus, rectum, kidney, and ureter. The articles are written by Villar, Faure, Delbet, Guinard, and Albarran, and seem to be prepared with care and thoroughness. The illustrations are not very numerous for a volume of such size, and, though sufficiently demonstrative, are scarcely good enough, in an artistic sense, to be used in a work of reference of such pretensions as *Traité de Chirurgie*. Most of them are too sketchy to be considered satisfactory. They, however, show the points to which the authors desire to call attention, and perhaps that is all that is really essential in illustrations.

Due consideration seems to have been given to American operators and writers on abdominal surgery, but the spelling of their names will sometimes be found a little unfamiliar to their American colleagues.

J. B. R.

# PROGRESS

OF

# MEDICAL SCIENCE.

## MEDICINE.

UNDER THE CHARGE OF

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**Cancer of the Stomach.**—H. STRAUSS (*Berliner klinische Wochenschrift*, 1899, No. 40) reports the case of a patient with carcinoma of the fundus and lesser curvature of the stomach, combined with subphrenic abscess between the anterior abdominal wall and the stomach. Strauss speaks briefly of the rarity of this complication, and goes on to speak in detail of the significance of pus in the stomach contents. In his own case, though the motor-power of the stomach remained good to the end, as much as a quarter of a litre of pus could sometimes be removed from the fasting stomach. In the washings of every fasting stomach leucocytes singly and in groups can be recognized. This, however, is not pus which, macroscopically recognized, is found in measurable quantities only under certain conditions. Aside from phlegmonous gastritis, abscess of the stomach, suppuration of the digestive tract above the stomach, and perforation or abscesses into the stomach, the author has found pus only in cases of cancer and in the present case of subphrenic abscess. In cases of cancer the pus was found especially in those affecting the lesser curvature or the fundus in which there was no motor disturbance. That it occurred in such cases is especially important because they are obviously difficult to recognize by the usual signs. The fact, however, is easily explained because in cases with stagnation the pus would become mixed with the food. Nevertheless, cases with stagnation reveal pus on microscopical examination, but in this a certain amount of experience in the microscopy of the stomach contents is necessary in order to exclude admixtures from outside of the stomach. The author, therefore, lays down a rule that in all cases of carcinoma of the stomach, especially when there is no disturbance of motility, the fasting stomach should be examined for pus.

The presence of blood has the same value as that of pus when pure or mixed with mucus or pus in the fasting stomach. The differential diagnosis

from achylia gastrica is especially difficult in such cases, and, according to the author's experience, by no means easy to make from the chemical examination alone. Thus, out of thirty-two cases of cancer of the stomach, of which four showed free hydrochloric acid, only fourteen gave an unequivocal lactic acid test. In three cases scraping with the soft tube revealed carcinoma particles. The author thinks that the positive result of scraping speaks rather for cancer than for achylia, and has seen no dangerous results from the operation. As with other signs, however, a single negative result is of no value. Strauss also calls attention to the value of certain metastases in the diagnosis of cancer of the stomach and in addition to the presence of these in Douglas' cul de-sac, mentions some in the mediastinal lymphatic glands, as shown by the Röntgen rays.

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**The Secretion of Pepsin in Gastric Diseases.**—ROTH (*Zeitschrift für klinische Medicin*, Bd. xxxix. p. 1) has made some experiments in Ewald's laboratory, using the method of Mett, and finds that, while easily carried out, it gives results sufficiently accurate for clinical purposes. According to this method egg albumen is coagulated in glass tubes from one to two mm. in diameter. The coagulation must be uniform. In order to get good results in different cases, Roth usually heated the tubes for fifteen minutes at 95° to 98° C. In the experiments all the tubes were cut in lengths of two to three cm. Roth used the filtrates after the Ewald breakfast, though bearing in mind the fact that filtrates do not digest as rapidly as unfiltered stomach contents. In addition to tubes placed in the native gastric juice, others were tried in gastric juice in which the free HCl had been brought up to thirty. Working in this way he found that the variations in the secretion of pepsin are normally just as great as those of hydrochloric acid. Cases of hyperpepsia were found, and the highest degrees of these were found in cases of irritation, such as ulcer or nervous anomalies of secretion. Low proportions of pepsin were found in atrophy following chronic gastritis, in carcinoma when associated with chronic gastritis, and in nervous disturbances. Pepsin determinations have less importance in diagnosis than in treatment. They are likely to be especially useful in cases where histological observations of the mucous membranes can be made by operations during life or post-mortem.

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**Dilatation of the Stomach after Traumatism.**—COHNHEIM (*Archiv für Verdauungs-krankheiten*, Bd. v. p. 405) saw a patient who, after a fall, had symptoms of gastric ulcer. A few months later he had marked symptoms of motor insufficiency and dilatation. On examination the stomach was found to contain large quantities of undigested food, yeast, sarcinæ, and free hydrochloric acid. An interesting point in the history was that the patient, on the advice of friends, took to drinking linseed oil, taking a small quantity every morning and night, and after five weeks of this treatment recovered entirely, as shown by an examination of the stomach contents. According to him, the linseed-oil treatment is well known in some parts of the world, and Cohnheim attributes to its use a soothing influence on the pylorus similar to that shown in cases of stricture of the œsophagus from new growth. Cohnheim has made a study of the cases of traumatic dilatation of the stomach in the literature

and from the records of Boas' polyclinic, basing the diagnosis of the dilatation always on the presence of decomposing food remains in the fasting stomach. The cases are cited in abstract, but sufficiently in detail to add much to the value of the article. It will suffice to give the author's conclusions from the examination of these cases:

1. Trauma in the stomach region can lead to chronic dilatation of the stomach by producing a perigastritis or ulcer. The acute dilatations observed after trauma are all due to obstruction of the duodenum from ileus.

2. Chronic traumatism such as pressure frequently leads, especially in men, to ulcer, and later to dilatation of the stomach.

3. Genuine gastrosucorrhœa is the consequence of relative stenosis of the pylorus or duodenum; it is not the cause of the gastric dilatation.

4. A large proportion of cases of dilatation result from frequently repeated pyloric spasm following ulcer with hyperchlorhydria, and can recover completely; a large proportion are the result of an organic obstruction, and can recover partially; only in a small proportion is the stenosis so severe that indications for operation are present.

5. A chronic dilatation in consequence of primary muscular weakness is highly improbable, and hitherto not demonstrated by unimpeachable observations.

6. Atony can only go on to dilatation when a complication involving an obstruction is added.

7. Dilatation is the result of a local process at the pyloric outlet; atony part of a general disease; between the two there is a difference of kind, not of degree.

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**Color Strength and Iron of Human Blood.**—ROSIN and JELLINEK (*Zeitschrift für klinische Medicin*, Bd. xxxix. p. 109) have a valuable paper on this subject, concerning which so much has been published in the last few years. A useful bibliography adds to the value of the article. The authors made comparative examinations by counting the blood-corpuscles, estimating the color-strength by Miescher's modification of Fleischl's apparatus, and the iron by Jolles' ferrometer. The details should be read in the original; we have room here only for some of the conclusions. In general the authors confirmed the statements of all previous writers that there is no fixed relation between the color and the iron, nor between these and the hæmoglobin of the blood. For determining the latter factor we have at present no accurate method. For clinical purposes the examination of all three things may give useful results, but the observations hitherto made are too few to give us the normal conditions in various diseases. As examples of some of the facts discovered by the authors in patients with valvular lesions, especially uncompensated ones, they found an abnormally high color with diminished iron and variable number of corpuscles; a high color was usually found in icterus, diabetes, and Graves' disease, with a low iron estimate and normal blood-corpuscles; the color strength was usually diminished in chlorosis and other anæmias, but the iron was higher than one would expect from the color. There were, however, cases with relatively high color-strength in comparison with the iron. In leukæmia, especially in severe cases, there was greatly diminished iron, but the color was not especially altered.

**Acute Œdema of the Lung after Thoracocentesis.**—ORTNER (*Wiener klinische Wochenschrift*, No. 44, 1899) has observed two cases of this kind, and has investigated their cause. In both cases there was absolute immobility of the heart, with adhesions of the pericardium to the heart and pleura or mediastinum, and in one case a fibrous mediastinitis. This latter condition the author looks on as an essential factor in the production of the fatal œdema, and he admits at the same time the well-known view that another factor is the abnormal permeability of the bloodvessels of the lung. The importance of the former cause was realized by some of the earlier writers, but among more recent ones only by Kovacs. Nevertheless, a search of the literature shows at least a dozen cases, quoted in the original, in which immobility of the mediastinum was present; and the fact is important to recognize in practice. Before puncturing the thorax it is necessary not only to investigate the functional condition of the heart, but also to bear in mind the possibility of an adhesive pericarditis or fibrous mediastinitis. The contents in suspected cases should be slowly emptied, only small quantities removed, and the operation suspended at once if severe coughing occurs.

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**On the Etiology and Symptomatology of Goitre.**—ADAMI (*The Montreal Medical Journal*, January, 1900, p. 1), after dealing at considerable length with the more important theories that have been advanced to explain the etiology of goitre, gives the following conclusions:

1. That the causation of ordinary endemic simple goitre is directly associated with the water habitually drunk by the subjects of the condition.

2. That no single constituent or contamination has so far, despite extensive search, been found common to the waters of goitrous districts.

3. That the peculiar epidemics at times recorded, coupled with the lack of discovery of chemical or toxic cause, appears to indicate miasmatic—*i. e.*, microbic causation

4. That if it exists the microbic agent is yet to be discovered.

5. A long series of forms can be made out from, on the one hand, those showing well-marked goitres with dulling of intellect and bodily habit approaching to the myxœdematous type, through goitres presenting no generalized disturbance, save occasionally such as may be attributed merely to pressure upon the surrounding organs, to other forms of ordinary goitre showing symptoms of the same order as those seen in exophthalmic goitre, to cases of true exophthalmic goitre, and, finally, to cases showing no enlargement of the thyroid but certain of the general symptoms which are peculiar to Graves' disease.

Adami then proceeds to discuss more minutely the relationship between ordinary and exophthalmic goitre. The French writers in the consideration of exophthalmic goitre refer to the "formes frustes"—incomplete forms. In America, W. H. Thompson, of New York, has laid particular stress on this class of cases. It includes those cases characterized by presenting to a greater or less degree the remarkable symptom-complex of exophthalmic goitre, without, however, any primary evidence of enlarged thyroid—exophthalmic goitre without exophthalmos and without goitre. These cases seem to form a connecting link between simple and exophthalmic goitre.

Adami states that anatomically we have every indication that the common

colloid goitre is pre-eminently a condition not so much of hyperplasia and overgrowth of the specific thyroid tissue as of retention of glandular secretion. Accepting this view we are able to recognize the possible development of the following series of conditions:

1. Disturbance of the thyroid so extensive as to lead to atrophy of the gland tissue, with the complete symptoms of cretinism (when occurring in the young) and of myxœdema (in the adult).

2. Disturbances insufficient to cause destruction of the gland tissue, but leading to arrest of discharge of the specific secretion from the follicles and heaping up of the same throughout the whole organ—generalized colloid goitre with myxœdematous or cretinoid symptoms.

3. Localized disturbances of the above nature, the remaining portions of the gland continuing to perform their functions normally; nodular goitre with absence of general symptoms, but with possible symptoms due to pressure of the enlarged portions of the gland upon the surrounding organs.

4. Localized disturbance leading to the heaping up and retention of colloid material in certain lobules of the thyroid, but with, in addition, the occasional occurrence of nervous stimulation or altered vascularity of the gland, whereby increased absorption or discharge of the retained material into the circulation is favored. Ordinary nodular goitre with paroxysmal dyspnœa, paroxysmal tachycardia, and other transient symptoms of hyperthyroidism, or of Graves' disease.

5. Supervention of increased discharge of thyroid secretion into the economy in a gland which is already the seat of ordinary retention goitre: secondary Graves' disease—*i. e.*, persistent tachycardia and other classical symptoms of Graves' disease following upon an ordinary goitre.

6. Increased activity of the thyroid gland with hyperplasia and enlargement of the gland: primary Graves' disease with accompanying enlargement without retention and exophthalmos.

7. Relative or absolute increased activity of the thyroid gland without at first any recognizable enlargement of the organ: formes frustes of Graves' disease.

Adami believes, however, that the essential cause of Graves' disease differs from the essential cause of ordinary goitre, and that Graves' disease in itself primarily depends upon some nervous or other stimulus acting upon the thyroid gland and leading to increased activity and increased secretion. The sudden liberation of some of the retained secretion is best calculated to explain the paroxysmal disturbance of the "Graves'" type often met with in the course of ordinary simple goitre, as again does sudden increased discharge or absorption explain the disturbances seen in the course of Graves' disease itself, as well as the dangerous and sometimes fatal results following the operative handling of the diseased glands.

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**Chronic Myocarditis with Cardiac Aneurism in a Child.**—ROSENSTEIN (*Zeitschrift für klinische Medicin*, Band 39, p. 142) has observed a case of this kind which is interesting not only on account of its rarity, but also on account of its possible dependence on tuberculosis. The patient was a boy, aged eleven years, who died shortly after an operation for gluteal abscess. As there were no clinical indications of heart disease, death was attributed first

to embolism of the lung. However, on autopsy the pericardium was found adherent over the apex of the left ventricle and the left edge of the heart. The left ventricle was dilated, globular, and slightly aneurismal at the apex. At this part the muscle was separated by lines of fibrous tissue, and there was a fibroid scar in the endocardium, gradually thinning out into the normal tissue. The valves and coronary arteries were normal. There were tubercles in the lungs and tuberculous infarcts of the left kidney; tuberculous coxitis with extensive destruction of the pelvis and head of the femur. Microscopically the focus of myocarditis showed old chronic interstitial changes in which specific tuberculous lesions could not be recognized, although 600 sections were examined. Nevertheless, the author thinks the condition was originally tuberculous. Acute infectious diseases and hereditary syphilis could be excluded, and it seems most probable that the disease had begun in the pericardium and the inflammation extended to the myocardium and endocardium, and there, in the most frequent seat of a cardiac aneurism, had led to the principal changes. The author was able to find only three cases in the literature in which chronic interstitial myocarditis of tuberculous origin was observed in childhood. In these cases the alterations in the walls had not gone so far as in the present case. Clinically the lesions are interesting as having assisted in causing death from chloroform.

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**The Reaction of Leucocytes to Guaiac.**—BRANDENBURG (*Münchener medicinische Wochenschrift*, February 6, 1900) calls attention to the guaiac test for leucocytes. His statement that it is not used in the diagnosis of pus in the urine as much as he thinks it deserves is based on forgetfulness of the fact that the centrifuge and microscope, essential in the examination of urine in any case, make the chemical test altogether unnecessary. The author's discussion of the cause of the reaction is interesting—namely, that it depends on the oxidizing effect of nucleoproteids in the pus-cells. It may be, however, that the reaction is due to a fermentation which could not be separated from the other substances. This point deserves further investigation. He has also studied the relation of various cells and extracts of cells on guaiac and finds that the nucleoproteids of the liver, spleen, and thymus are all capable of breaking down hydrogen peroxide, but do not turn guaiac tincture blue. Only one tissue of all that he examined was able to produce the same reaction with guaiac as pus—namely, bone-marrow. Leukæmic blood, even in the smallest quantities, in marked cases turns guaiac tincture blue. In making the test two or three drops of blood are diluted with water and filtered. The filter is washed several times, and then a few drops of the tincture added. In one case of myalogenous leukæmia 0.04 c.cm. of blood gave a deep blue color. Tissues from a case of myalogenous leukæmia treated with guaiac tincture showed a deep blue in all the vessels, so that they looked as if injected. The author has not been able to satisfy himself that all leucocytes are concerned in the guaiac reaction or only those of certain groups, but from his work hitherto he thinks it probable that only the leucocytes derived from bone-marrow are concerned. This part of the work especially is worthy of control investigation.

# SURGERY.

UNDER THE CHARGE OF

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**Tuberculous Disease of the Kidney.**—DAVID NEWMAN (*The Lancet*, February 24, 1900) divides tuberculous disease of the kidney into three clinical forms:

1. Acute miliary tuberculosis.
2. Local tuberculosis, or renal phthisis.
3. Tuberculous or caseous nephritis.

All these varieties are due to the presence of tubercle bacilli and to an infective process resulting therefrom, but the channels through which the virus reaches the kidneys and the methods by which local infection takes place vary in different cases.

Two conditions are necessary to the establishment of renal tuberculosis—the presence of a suitable nidus and the conveyance of the specific organism to the part. The writer calls attention to the important clinical fact that tubercle bacilli carried by the blood to the kidney may be eliminated without any morbid change. From this it is evident that tubercle bacilli in the urine are not a positive evidence of tuberculosis of the urinary organs, but are positive proof of a tuberculous lesion somewhere in the body. When the kidney eliminates these bacilli without itself becoming involved it must be assumed that either the quantity carried to the organ at a given time is too small, or that the virulence of the microbes is insufficient to overcome the normal preventive power of the renal tissue and to produce the specific pathological effect. The natural power of the renal tissue to destroy micro-organisms may be rendered less effective by malformations of the organs or by disease. Hence it is that Bright's disease, cystic degeneration, amyloid degeneration, and congenital malformations and displacements all tend to make the kidney more liable to septic and tuberculous disease. Acute febrile diseases are also predisposing causes.

The kidneys may be invaded in four different ways: 1. By the blood-stream (*a*) the tuberculous particles may be so small as to be stopped only in the ultimate capillaries, where they give rise to numerous miliary deposits (in such instances the blood-stream becomes contaminated while passing through tissues or organs foreign to the urinary apparatus); or (*b*) tuberculosis may arise from infective emboli passing into a branch of the renal artery, the tuberculous virus becoming disseminated over the area of its distribution.

2. By invasion along the lymphatics of the kidney from foci in the lower urinary tract. 3. By contagion along the lumina of the excretory ducts. 4. Spreading to the kidney by continuity from other organs. It must, however, be borne in mind that while primary infection is conveyed to the kidney by one of these channels the infective process becomes more complicated as the disease advances; indeed, the mode of extension comes to involve a combination of the processes just mentioned.

Infection by the blood-stream may take place either through the capillaries (acute miliary tuberculosis) or by tuberculous embolism of the arteries.

Ascending renal tuberculosis, or infection by invasion along the lymphatics of the kidney from foci in the lower urinary tract, is by no means uncommon. Ascending infection may also take place along the lumen of the excretory duct, as is occasionally observed in the conveyance of septic infection. In some cases the whole route of infection may be traced from a lesion on the mucous surface of the bladder along the ureter, the pelvis, and into the uriniferous tubules of the pyramids. In the bladder and ureters the tuberculous process begins by the formation of the tubercle in the mucous membrane, and these, by breaking down, form the so-called "lenticular ulcers," which are characterized by a flat base covered by caseous matter and sharp, rugged borders within which little miliary nodules are situated. The ulcers are at first circular, usually superficial. Their edges are slightly raised and are surrounded by a pale anæmic zone set in a deeply hyperæmic mucous membrane. In the bladder these ulcers frequently coalesce, forming larger ones of irregular outline. Their favorite seat is the trigone and fundus of the viscus.

The comparative frequency of tuberculous disease of the kidney may be judged by the following statistics, quoted by Roberts. They embrace both primary and secondary deposits, the latter being found, especially in children, by far the most frequently. Of 1317 tuberculous subjects examined in the Pathological Institute of Prague (out of a total of 5000 bodies) tubercle in the kidney was found 74 times, or in the proportion of 5.6 per cent. of tuberculous subjects. Among 315 tuberculous children Rilliet and Barthez found tubercle in the kidneys 49 times, or in the proportion of 15.7 per cent. Dickinson also alludes to the relative frequency of renal tuberculosis in children and in adults, and in a table compiled from the post-mortem records of St. George's Hospital and the Hospital for Sick Children, Great Ormond Street, he shows the frequency of tuberculous formation in the kidney and other organs in 600 post mortem examinations, the subjects in the one 300 being under the age of twelve years, and those of the other 300 twelve years and upward. Of the former group 49, and of the latter group 17, suffered from tubercle in the kidney. These results correspond so closely with those of Rilliet and Barthez that there can be little doubt that renal tuberculosis in one form or another is specially a disease of early life, but whether the renal lesion is a secondary or a primary one is not shown in the statistics just referred to. Dickinson does not distinguish between the two forms, miliary and caseous; for "the miliary," he says, "become caseous as they enlarge, so that although in some cases there may be only one or only the other, yet they are continually intermixed and inseparable as different results of the same process." From the surgeon's stand-point it must appear, however, very important to

distinguish between a disease which involves the whole system and another which primarily attacks an individual organ or part of an organ, even although they are histologically the same pathological process. With the distinction just referred to in view, Morris shows, by an examination of the records of the Middlesex Hospital, that of the 40 cases of tuberculous kidney met with in 2610 necropsies, 29 were miliary (secondary) and 15 were strumous (primary). Of the 29 cases of miliary tuberculosis, 18 were males and 11 were females, and in 28 out of the 29 cases both kidneys were diseased, while in the 15 cases of primary renal tuberculosis (9 males and 6 females) both kidneys were diseased in 8 patients. Another point worthy of note is the different periods of life at which the two forms of disease occur. In the miliary (secondary) tuberculosis 12 cases occurred in persons under ten years of age, 8 in persons between the ages of ten and thirty years; 6 in persons over thirty years of age, and three in persons whose ages are not stated. In the scrofulous (primary) tuberculosis no cases occurred in persons under eleven years of age, 5 occurred in persons between the ages of eleven and thirty years, 7 in persons over thirty years of age, and 3 in persons whose ages are not stated.

*Symptomatology.* In all cases of pyuria, with renal symptoms associated with rapid emaciation, anæmia, elevated evening temperature, and rapidly progressing marasmus, tuberculous disease should be suspected. The urine is acid. As a rule, there is not much pain in the kidney, nor is it greatly enlarged.

Polyuria is generally one of the first symptoms, and is probably due to hyperæmia produced by the presence of bacilli or their toxins. Hæmaturia is seldom marked, but it may be the initial symptom. The detection of tubercle bacilli in the urinary deposit is of great value. It is important to determine whether one or both kidneys are involved.

*Prognosis.* The prognosis in renal tuberculosis is unfavorable. It is especially grave when the disease extends to the ureter and bladder or to the other kidney.

*Treatment.* Nephrotomy should be practised if the disease is limited to a small area or has formed a cavity which can be easily drained. If, however, the wound fails to heal and the discharge continues removal of the kidney must be resorted to. Partial excision is probably not a suitable operation for tuberculous lesions. Nephrectomy should be the operation of choice when the disease extends over a large area and also in cases where nephrotomy has failed, it being understood, of course, that the general condition of the patient will permit of this operation.

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**Renal Papillectomy.**—E. Hurry Fenwick (*Brit. Med. Journ.*, February 3, 1900) under the above title offers a contribution to the study of painless unilateral renal hæmaturia in the young adult. This condition has been recognized only since the introduction of the cystoscope. A number of such kidneys have been exposed and opened without discovering the origin of the hemorrhage. From his experience in two recent cases, Fenwick is convinced that our ignorance of the actual cause of the hemorrhage is entirely due to a faulty operative technique. He has been forced to conclude that an examination with the finger is futile; and that if we propose to ascertain the origin

of the bleeding we must open the pelvis itself and examine every part of it by means of a strong light (renal pelvoscopy).

He submits that in some at least of these cases the bleeding emanates from one of the renal papillæ and the mucous membrane clothing it; that the papillary part of the Malpighian pyramid is engorged, and that its papilla is covered with a plexiform mesh of dilated vessels (varicosity of the papillary plexus). He suspects this vascular change is due to a localized patch of interstitial nephritis impeding the circulation in the boundary layer of the pyramid, and thus preventing venous drainage of the papillary plexus. It may be that the vessels are actually altered in the same way that the entire circulation becomes affected in the advanced stages of bilateral interstitial nephritis. Be that as it may, the site of disease is apparent only on opening the renal pelvis. A vivid red papilla assuming the aspect of a tiny villous growth stands out in strong contrast to the pale papillæ around.

It is asserted that the removal of this vascular papilla with a sharp scoop is sufficient to arrest a renal bleeding which no drug can control.

Two cases are described in support of the author's views, both of which were cured by the operation of papillectomy.

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**Suture of Fractured Patella by an Improved Method.**—R. GLASGOW PATTESON (*Brit. Med. Journ.*, February 3, 1900), after a careful review of the subject of the operative treatment of fracture of the patella, concludes from an analysis of recorded cases that the causes of failure might fairly be classified under two heads: (1) The adoption of subcutaneous methods, in which no effort is made to relieve the tension in the joint, due to the extravasation of blood and serum, and in which accordingly no certainty of accurate approximation of the bony surfaces can be secured; and (2) the use of unsuitable materials for suturing the fragments together, and a faulty method of performing the operation in cases where the open treatment was selected.

The proposed method is described in connection with the following case: A man, aged twenty-four, was admitted to the Hospital, November 11, 1898, having sustained a fracture of the patella on the previous day from a fall. The knee was greatly distended, very tense, and a transverse fracture in the lower third of the patella was present, the two fragments being separated about one inch. The limb was elevated, a posterior splint fitted, and evaporating lotions applied for three days. On the 14th, the swelling and pain having greatly lessened, the knee-joint was opened by a large U-shaped flap with the convexity downward. The U-shaped flap was adopted because it gives freer access to the broken fragments, and should a suture abscess or other accident to the skin-wound occur the joint is removed from the seat of the infection. When the joint was opened a number of clots were washed away with sterilized water. By means of a blunt periosteal elevator the bony surfaces were cleared. A single hole was then drilled in each of the two fragments for the reception of the wire suture. The wire had been specially prepared previously and was D-shaped of No. 16 gauge, and made of the softest silver. The wire was passed through the drill holes, the fragments cleansed and placed in proper apposition and the wire looped. The divided aponeurosis and periosteum were closely sutured with fine silk over the underlying wire. In this way the fractured surfaces were completely protected. The

author regards this as one of the most important steps of the operation. The skin was closed, the wound dressed, and a light posterior splint applied. The convalescence was satisfactory in every way, and eight weeks after the operation the man was able to walk over two miles.

In connection with this operation the author especially emphasizes the following:

1. The advisability of delaying operation for a few days after the injury until the subsidence of the more acute symptoms in the joints.

2. The thorough clearing out of the joint, all the recesses of the synovial membrane being completely freed from clots, and the broken surfaces of the bone thoroughly cleaned. This can only be secured by the open operation.

3. The use of an easily-sterilizable suture strong enough to secure apposition by a single drilling, and so shaped as to render splitting of the bone an impossibility, and to prevent, in fastening it, the formation of a large and irritating loop.

4. The elevation and not the resection of the fibrous curtain and its subsequent accurate suturing over the embedded wire, forming an additional barrier underneath the skin-flap against infection or irritation.

5. The early commencement of passive movement, which is thus rendered feasible, and undoubtedly greatly shortens the period of disability following the fracture—a point of paramount importance to the class of persons most subject to the injury.

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**Gastrostomy by Franck's Method.** — COLIN MACVICAR describes the following case (*Brit. Med. Journ.*, February 3, 1900): A woman, aged sixty-three years, sought advice in June, 1898, on account of difficulty in swallowing. One brother had died at the age of fifty-three from carcinoma of the stomach. The family history was otherwise negative. Fifteen months previously some difficulty was experienced in swallowing, and for the past year she was able to take fluids and semi-solids only. In January, 1898, pain was experienced over the lower end of the sternum on swallowing. A soft rubber stomach-tube was arrested at the cardiac extremity, but passed into the stomach by continued steady pressure.

Franck's method of gastrostomy was carried out. The patient survived four months, which was two or three months longer than the average expectation of life.

Regarding the selection of methods, the author states that those of Witzel and Kader are more suitable where one desires a temporary fistula, as the opening soon closes on withdrawing the tube, while those of Franck and Marwedel are to be preferred in malignant cases where a permanent fistula is desired. The methods of Witzel and Franck are practicable only where little or no cicatricial contraction of the stomach exists.

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**On Surgical Disinfection.**—A. J. OCHSNER describes in the *Chicago Medical Recorder*, February, 1900, the methods of surgical disinfection employed at the Augustana Hospital, Chicago. The following conclusions give a summary of his views:

1. (*a*) Theoretically it is almost impossible absolutely to disinfect the skin of the patient and the hands of the operator. (*b*) Practically it is one of the

easiest and simplest tasks to obtain a degree of surgical cleanness that will insure primary wound-healing.

2. (*a*) Theoretically strong chemical disinfectants are indicated for the purpose of disinfecting the hands. (*b*) Practically careful washing with the mildest, viz., soap and water and alcohol, is absolutely sufficient and very much safer for the patient, because hands roughened by the use of the strong antiseptics are much more likely to become hopelessly septic than hands which are covered with smooth, healthy skin.

3. (*a*) Theoretically it is extremely simple to keep the hands aseptic after they have been rendered so. (*b*) Practically there is no more difficult task in any clinic than to keep all interested hands clean after they have been disinfected.

4. (*a*) Theoretically sutures passing through the skin and the deep tissues underneath are a menace to the patient, because they form a direct communication between the skin which contains staphylococci and the deep tissues which are primarily sterile. (*b*) Practically these stitches never cause an infection, unless drawn too tightly, in which case the resulting pressure-necrosis is the cause of the mischief, because it furnishes these micro-organisms dead tissue to thrive upon.

5. (*a*) Theoretically catgut sutures and ligatures are objectionable. (*b*) Practically, if applied properly and not tied too tightly by a clean surgeon with clean assistants, they are absolutely satisfactory and not objectionable.

6. (*a*) Theoretically it is as safe to operate upon clean cases after dressing suppurating wounds as at any other time. (*b*) Practically surgeons who follow this practice always have a great amount of wound-infection on account of accidental contamination of something coming in contact with the wounds.

In order to have wounds heal without suppuration, he believes the following conditions should be considered:

1. The surgeon, his assistants, and nurses must be habitually clean, and the skin of their hands must be free from irritation and roughness.

2. Their attention should constantly be directed toward the prevention of accidental infection.

3. The surgeon and his assistants should be careful not to breathe or speak into the wounds.

4. Tissues should not be exposed to unnecessary traumatism.

5. Sutures should not be tied tightly enough to cause pressure necrosis.

6. A reasonable system should be employed, so that everyone concerned can assist intelligently in preventing infection.

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**A New Method of Treating Varicose Ulcers of the Leg.**—BARDESCU (*Centralblatt für Chirurgie*, 1899, No. 28) reports two cases of chronic indolent and indurated ulcer of the leg which he treated by section of the long saphenous vein and stretching of the common peroneal nerve. This treatment he bases upon the nerve pathology of these lesions, which shows them to be phlebo-neuro-trophic in character.

The result of the nerve-stretching was a local anæsthesia in the area of the ulcer and the distribution of the nerve. This ensued immediately, and was followed by a rapid disappearance of the induration, the formation of

healthy granulations, and the final development of a healthy, strong scar. The worst case, in which there were ulcers on both legs that had existed for over seven years and defied all treatment, healed in twenty-seven days. The patient was seen a year after the operation and had returned to his former life and work, and yet the scar showed no tendency to break down or the condition of varicosity to return.

The portion of nerve to be stretched is entirely dependent upon the area of skin involved in the varicosity and ulceration.

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**Urethro-prostatic Infection.**—NOGUES and WASSERMAN (*Ann. Mal. Genito-Urinair.*, July, 1899) have made a careful study of this subject and arrive at the following conclusions:

There are cases of urethro-prostatic infection in which the infecting agent is a diplococcus which is readily decolorized by Gram's method and has a number of points of resemblance with the gonococcus.

2. Although these diplococci decolorize by Gram's method, they have not the morphological characteristics of gonococci, and no cultures are exactly identical with the microbe they have cultivated, except possibly that described by Hogge.

3. These diplococci can be clearly differentiated from the gonococcus by the characteristics of the culture. This goes to support the contention which these authors have always held that the gonococcus has a marked individuality which makes it possible to distinguish it always from the forms that resemble it, and that this in nowise justifies the belief in pseudo-gonococci.

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**Two Recent Operations on the Gasserian Ganglion by the Hartley-Krause Method.**—THOMAS (*British Medical Journal*, October 21, 1899) reports two cases of successful operation upon the Gasserian ganglion and the second and third divisions of the fifth nerve for neuralgia. The neuralgia had lasted two or three years in spite of treatment. Both were operated upon in one sitting, and in one the bone was replaced. In the other the middle meningeal artery was torn. This taught the operator to remove the posterior limb of the bone before attacking the anterior, where the artery is liable to be injured. The deformity is lessened by replacing the bone.

In cleansing the scalp he used a depilatory powder that has as its active ingredient sulphite of barium. It destroys the hair, and with it the superficial layer of skin. All can be removed with a spatula. It is a very thorough antiseptic method and promotes primary union.

Instead of tearing out the distal portions of the severed nerves—a method which was found impracticable to any great extent—the author prevented future regeneration of the nerve-trunks by blocking up the foramen rotundum and foramen ovale with Hartley's wax. The advantages of the wax are: 1. The ease with which it can be used. 2. The firmness with which it adheres to the bone. If this wax does not suffice, the author advocates the employment of a more lasting material, a mercury amalgam, used by dentists to fill teeth.

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**Terminal Hæmaturia and its Treatment.**—POSNER (*Therap. der Gegenwart*, 1899, No. 5) recognizes by this term a form of hæmaturia where the first

portion of the urine is clear, followed in the terminal portion by intense pain and the discharge of a few drops or even a larger amount of pure blood.

Very frequently its cause is a posterior urethritis of gonorrhœal origin, which has included the prostate. The ordinary methods of treating acute catarrh of the bladder should be employed in these cases. Rest in bed, regulation of the diet, and stools. Internally, ol. santali., but without warm sitz baths, warm compresses, or mineral vaters. Only in the most resistant cases should local treatment be applied. In chronic gonorrhœa the local treatment should be commenced earlier.

Terminal hæmaturia is further an evidence of the presence of foreign bodies, as calculi, or of tumors, or the early stages of senile prostatic hypertrophy, and very frequently of tuberculosis of the bladder. In the latter cases all local treatment is avoided and a symptomatic treatment instituted. Urotropin is generally useless, and it is better to avoid sublimate solutions, even 1:30,000. Hæmostatic drugs have very little value; hydrastis is the best. Frequently the passing of a catheter will suffice to still the bleeding by reducing the congestion. The local use of tannin of the iron salts is to be avoided.

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## PEDIATRICS.

UNDER THE CHARGE OF

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AND

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**The Etiology of Dysentery.**—ESCHERICH (*Centralblatt für Bakteriologie*, 1899, Band xxvi., No. 13, S. 385), referring to a recent publication of Shiga and Celli upon the etiology of dysentery, reviews the communication which he made upon this subject at the Congress of Carlsbad, when he described a number of cases under the name of coli-colitis, which he considers identical with those observed and described as infectious colitis two years ago by Finkelstein.

Escherich's cases appeared in epidemic form during the winter of 1894–1895. Fifteen children were affected, seven of whom died. A second epidemic occurred in 1896, and cases were seen again in 1898. The symptoms were those of an acute infectious inflammation of the mucosa of the large intestine, beginning abruptly with fever and collapse, the stools containing mucus, blood, and pus, not copious, but frequent, and attended with rectal tenesmus. The abdomen was retracted and the contracted descended colon could be easily palpated. Later the course was apyretic, with tendency to relapse. From the stools almost pure culture of the colon bacillus was obtained. Autopsy showed the lower portion of the large intestine con-

tracted, thickened, its mucous coat swollen, congested, and covered with ecchymoses, in places presenting actual follicular ulcerations.

The symptomatology and the anatomic lesions were therefore those of a catarrhal dysentery such as have been described by Heubner. In these cases, as in those which have been more recently described by Shiga and Celli, the serum of the patients produced agglutination of colon bacilli obtained from culture of their intestinal discharges. Escherich therefore concludes that the cases of dysentery he observed were provoked by colon bacilli.

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**Treatment of Typhoid Fever in Children.**—GLÉNARD (*Revue mensuelle des Maladies de l'Enfance*, January, 1900, p. 31) makes an interesting contribution to the discussion that has been raised in recent years as to the efficacy of the Brand system of treatment, restricting his study to the application of the bath treatment to the disease in children.

He first refers to the statistics, and shows that the mortality of cases treated by purely medicinal means is about 15 per cent., and that when the bath is employed as a succedaneum to a medicinal treatment, the figures are reduced to 11 per cent., while under a systematic bath treatment the mortality falls to 2.5 per cent. Even when treated by the mixed method, he says, typhoid fever in the child is a grave malady, because this ratio, which is an average one, can in certain cases, despite mixed treatment, reach double or triple the figures given; and if the epidemic is severe, and especially with children under five years of age, the mortality reaches the figures that obtain in cases treated by medicinal means alone. Moreover, he states, with the mixed method the prognosis remains uncertain, there is decided tendency to complications, even in the benign cases, the duration is long, convalescence is slow, and sequelæ may leave permanent effects.

On the other hand, he believes, with the systematic bath treatment, the mortality of which varies little from the average figures stated, and never exceeds a maximum which is very low, the prognosis is good from the first days of the disease, the complications are reduced to a minimum, convalescence is short, and sound health is assured.

Collapse, he states, is never observed among children by physicians who apply the systematic bath treatment to typhoid fever any more than by those who treat in the same way infantile pneumonia, a disease in which the heart is much more seriously menaced. The cause of collapse is to be attributed neither to too low a temperature of the bath, nor too prolonged a duration of the exposure within the proper prescribed limits as understood by the physician; but it is rather to be attributed to too high a temperature of the bath or to the cold bath given at too advanced a period of the disease without the medicinal help indicated by the state of the heart.

In the mixed treatment, he concludes, collapse may occur, because it is not the methodical treatment by the cold bath, and because the cold bath is not the basis, the essence, of the treatment.

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**Leucocytosis in Whooping-cough.**—DE AMICIS and PACCHIONI (*Revue mensuelle des Maladies de l'Enfance*, January, 1900) have observed that the blood of pertussis patients constantly shows a leucocytosis which reaches a

maximum in the spasmodic stage. It begins in the first days of the disease, and is occasionally prolonged for some time after the cessation of the typical paroxysms. It is largely at the expense of the lymphocytes.

In no other disease of the respiratory passages is a similar or so marked a leucocytosis encountered. The constancy of this feature of the disease suggests it as a valuable aid in early diagnosis, when prophylaxis may yet be possible.

The authors consider that this phenomenon is further evidence in support of the infectious origin of whooping-cough, were such needed at the present day, and that the important part in its production played by the leucocytes indicates a very active participation of the tracheo-bronchial lymphatic system.

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**The Pathogenic Action of the Proteolytic Bacteria of Milk.**—JEMMA (*Revue mensuelle des Maladies de l'Enfance*, January, 1900, p. 20) makes the following résumé of the conclusions of a study under this title:

1. The ferments of casein which are found most frequently in milk belong to the group of the bacillus subtilis; this has no pathogenic influence upon animals experimented upon in the laboratory.

2. There may be encountered among these ferments of the casein certain microbes belonging to the group of the bacillus mesentericus vulgatus; among them are at times found certain bacilli possessing pathogenic properties, which explains the effect upon the intestinal mucous membrane produced by the ingestion of large quantities of these germs. Introduced within the peritoneum, into the blood, or under the skin, they produce no effect. From this it appears that the pathogenic action of these bacteria depends not upon toxins secreted by them, but upon disturbances they provoke in the intestinal contents and in the mucous membrane of the intestinal tract.

3. The bacillus butyricus of Hüppe and other varieties of this group isolated from milk are nearly always devoid of pathogenic action.

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**A Case of "Scurvy-rickets" in a Boy of Twelve Years.**—EDMUND OWEN (*British Medical Journal*, December 23, 1899, p. 1719) records an exceedingly interesting case of scurvy observed in a boy of twelve years who had been allowed to live upon a diet entirely destitute of fresh fruit and vegetables. He exhibited marked rhachitic symptoms. The rosary was quite characteristic and the epiphyses of the radii were distinctly enlarged. Whether this condition had existed in infancy was unknown. The patient was a school-boy living in the country. He had apparently been always healthy, though nine months before he had been in the hospital for division of each tendon of Achilles. From the time of the operation he had been feverish and fretful, and the parents had given way to him on all points. On admission to the hospital, under Mr. Owen's care, he was very anæmic and sickly and had a wrinkled face. The knee-joints were swollen, some fluid was present; the ankles and feet were swollen and œdematous. The height was three feet eleven inches, and the weight only thirty-nine and one-half pounds. The teeth were slightly loosened, the gums spongy and occasionally bleeding when he ate hard food. The abdomen was swollen, the liver and spleen slightly enlarged. The urine was

alkaline, specific gravity 1030, and contained a considerable amount of blood. The heart and lungs were healthy. As regards the diet, his mother said that he persistently refused to eat vegetables and fruit, and that he took little milk. At breakfast he had egg or bacon or some such thing, with bread and cocoa; at dinner meat or fish, with occasionally a little potato and more cocoa; later in the day he had tea and bread and butter, with occasionally potted meat; and at supper bovril or cocoa.

Subperiosteal effusion was present at the lower end of the tibial diaphyses, over each tarsus and the lower end of the femora.

After a sojourn of ten days in the hospital upon a diet of fresh fruit and vegetables, beef jelly, sweetened lemon juice, milk, meat, and bread and butter he was greatly improved.

The case is of great interest on account of the age of the child, which is far advanced beyond that at which infantile scurvy is ordinarily encountered.

[The origin of the stigmata of rickets in this case is doubtless to be assigned to the period of infancy, and there seems to be no evidence in the history that there was any closer relationship between the rhachitic lesions and the scorbutic symptoms. From this point of view the case should be classed rather as a scurvy of ordinary type than as an instance of infantile scurvy or "scurvy-rickets," as English writers are disposed to call it, occurring at an advanced age.—ED.]

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**Aneurism of the Aorta in a Child.**—ROGERS (*Pediatrics*, August 15, 1899) records a rare instance of aortic aneurism in childhood. The patient was a girl, aged ten years, with a good family history, very anæmic, and showing a loud, rough, systolic murmur all over the cardiac area, loudest over the pulmonary region. The apex was displaced one inch outward, and a distinct fremitus could be felt. The progress of the case differed from that of ulcerative endocarditis. The temperature was constantly elevated, and the murmur increased in loudness. The urine was normal. Death occurred suddenly from cardiac failure. At the post-mortem the pericardium was found to contain some fluid with flakes of recent lymph in it; the left ventricle was greatly hypertrophied, and the aortic valves glued together by large vegetations. About half an inch above the right side of the anterior semilunar valve of the aorta was a rugged hole, the opening of a small aneurism, which was about the size of a cob-nut and was partially filled with clot. The other organs were healthy. The aneurism was not in the position of the obliterated ductus arteriosus.

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**The Composition of Backhaus' Milk for Infant Feeding.**—KOLISKO (*Arch. f. Kinderheilkunde*, Band xxvi., Heft v. und vi.) describes the preparation of Backhaus' food as follows: Mixed milk is passed through the centrifuge and the cream separated. The separated milk is exposed to the action of a mixture of rennet, trypsin, and sodium bicarbonate, which are combined in such proportions that the trypsin will have converted 30 per cent. of the casein into soluble albumin at the end of thirty minutes. By this time the rennet coagulates the balance of the casein, and thus arrests the action of the trypsin. The temperature is then raised to 80° by the introduction of steam, and this temperature is maintained for five minutes. The

milk is then strained through cloths, mixed with half its volume of water, one-fourth the volume of cream, and the necessary amount of milk-sugar. This mixture is then bottled in vials holding 125 grammes (four ounces) and sterilized.

A second grade for older children is obtained by mixing equal parts of the predigested milk and water with half the quantity of cream and with milk-sugar. This is supplied in bottles holding 200 grammes (six and one-half ounces).

A third grade, which imitates cow's milk in composition, and is supplied in bottles holding 300 grammes (ten ounces), is prepared by a similar method of modification.

The first grade shows the following composition: Fat, 3.1; sugar, 6.0; casein, 0.6; albumin, 1.0; ash, 0.4. The second: Fat, 3.2; sugar, 5.4; casein, 1.8; albumin, 0.3; ash, 0.4. The third grade shows: Fat, 3.3; sugar, 4.8; casein, 3; albumin, 0.5; ash, 0.7.

This preparation has been tried by Frühwald in twenty cases, the histories of which are given in the paper. All excepting six were under observation for more than two months. When first put upon this mixture all were suffering from different forms of digestive trouble and from malnutrition; some were suffering from severe marasmus, and most of them passed through some other acute disease while under observation. Under one or other of these mixtures average daily gains of 18 to 30 grammes were made (about one-half to one ounce). In private practice and in healthy children a daily gain of 50 grammes (one and one-half ounces) was said not to be rare.

## THERAPEUTICS.

UNDER THE CHARGE OF

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**Euphthalmin.**—Dr. Albert B. Hale states that in using mydriatics for diagnostic purposes three factors must be considered: (1) The least desirable is the action of the drug on the ciliary muscle, for however valuable this may be in estimating errors of refraction, it is always intensely disagreeable, often dangerous to the patient, and certainly unnecessary for the study of the liver or fundus. (2) The anæsthetic effect, most marked in cocaine, least so in atropine, which is of no use in diagnosis. (3) The most important is the dilatation of the pupil. To obtain the first effect we use atropine, scopolamine (hyoscine), duboisine, homatropine or cocaine, named in the order of their strength. To produce local anæsthesia cocaine and eucaine have disadvantages which have been overcome by halocaine. To produce the third effect we have had hitherto to resort either to atropine, which is so powerful as to be dangerous, and so lasting as to be disagreeable,

or to homatropine, too closely allied to atropine for any practical advantage, or to cocaine, which proves annoying by its slight mydriatic effect or by its primary desiccation of the cornea and subsequent hyperæmia of the conjunctiva. To produce pupillary dilatation without anæsthetic effect or alteration of accommodation the euphthalmin meets the requirements of the practitioner. In 5 or 10 cent. solution it produces no subjective symptoms. It causes only mydriasis, pronounced, but of short duration. Its effect appears earlier in youth than in old age. It is apparently non-poisonous.—*The Chicago Medical Recorder*, 1900, No. 2, p. 126.

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**Fluid Extract of Lemon in Malarial Prophylaxis.**—DOTT. EUGENIO DIMATTEI notes that after continuous administration of this remedy to the *personnel* of a railway traversing a malarial district, the attacks of malaria regularly diminished, the fever was milder, and its duration shorter. The percentage of instances of malaria per one hundred persons was in 1890–1894, 66; 1895–1898, 32; while in the year 1898 it was only 25.—*Gazzetta degli Ospedali e della Cliniche*, 1900, No. 3, S. 31.

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**Aneurism Treated by Subcutaneous Gelatin Injections.**—DR. THOMAS B. FUTCHER quotes Lancereaux as follows: The gelatin solution is made by dissolving a drachm of white gelatin in six and two-third ounces of normal salt solution and sterilizing thoroughly at 180° F. The flasks are kept at 100° F. No pain should follow injection. With antiseptic precautions there is no local or general reaction. Absolute rest should follow injection, and palpation of the aneurism should not be practised. Injections at intervals of six to eight days; fifteen or twenty are necessary to effect a cure. Injections are to be made into the subcutaneous tissue of the thigh and never into the aneurism or near it. A proper diet is imperative, and a strict milk diet is preferable; fruits and leguminous foods may be permitted. Iodides and nitrites (vasodilators) are indicated. Three of five patients were cured. Those cured had sacculated aneurisms. The other two showed diffuse dilatation of aortic arch (Lancereaux). Conclusions from nine patients recently treated by this method are: 1. In no instance was the aneurism cured, though diminution in size in one patient was remarkable. 2. In seven of the nine patients there was marked diminution in the subjective symptoms referable to the pressure of the aneurism. 3. The subcutaneous injection of gelatin solution does not materially increase the coagulability of the blood. 4. The injections are very painful, pain being most intense about six hours after injection. 5. There is frequently elevation of the temperature. Two to four hours after the injection there were distinct chills with temperature as high as 105° F. There was no local suppuration, and in only one instance did a local reaction follow. 6. Though the writer can report no patient cured, he recommends further experimentation with this method of treatment.—*Journal of the American Medical Association*, 1900, vol. xxxiv., p. 204.

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**Naphtalin and Oxyuris Vermicularis.**—DOTT. AGOSTINO SORINI gives a preliminary dose of calomel, and then for a week twenty-two grains of the remedy each day. At the end of the second week no worms were found, and

the feces were free from them during about two months. Care should be taken (1) that the remedy is pure; (2) to forbid fats and alcohol, in which it is soluble; (3) not to use a too large dose and to interrupt from time to time its administration to avoid untoward phenomena from kidneys, bladder, and eyes, such as have been pointed out by various observers.—*Gazzetta degli Ospedali e della Cliniche*, 1900, No. 6, p. 52.

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**The Treatment of Ulcers of the Leg.**—Dr. Karl Steiner recommends crurion (chinolin-bismuth rhadanate), which possesses the chemical formula of $(C_9H_7N.HSCN)_2\ Bi(SCN)_3$. This occurs as a reddish-yellow powder of a somewhat pungent odor, insoluble in alcohol, ether, and water. On cleansing the ulcer the powder is dusted on. Should the burning pain following its application be severe it may be diluted with an equal amount of starch. Under this treatment the ulcers rapidly heal and surgical interference becomes unnecessary.—*Therapeutische Monatshefte*, 1900, Heft 1, S. 22.

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**Bromoform.**—Mr. Wilbur L. Scoville presents the following as a mixture containing practically no alcohol, susceptible of accurate dosage, and changes in dosage are possible without altering the proportion of the other ingredients: Bromoform, 1; tincture of tolu, 2; mucilage of acacia, 4; syrup, 8; peppermint water, 32. To prepare this the mucilage is placed in a bottle, an equal volume of syrup added, then the bromoform and tolu, in portions, shaking well after each addition. To this thin emulsion add the rest of the syrup and mint water, with agitation. The above formula contains two minims of bromoform in each teaspoonful. To eliminate alcohol absolutely the syrup may be employed in place of the tincture of tolu.—*Pediatrics*, 1900, No. 2, p. 76.

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**Therapeutics of Heroine.**—Dr. Morris Manges describes the drug as a white crystalline, odorless powder, bitter and alkaline. It melts at 340° F., and is insoluble in water. Solutions are easily obtained by the addition of a few drops of an acid. Heroine, chemically, is morphine, in which both hydrogen-hydroxyl atoms have been replaced by the acetyl radicle $OC.CH_3$, thus forming the diacetic ester of morphine. Heroine hydrochloride is a neutral salt soluble in two parts of water. Except that its melting-point is much higher, its physiological properties are as for heroine itself. Triturated tablets are the best form for administration, or in solutions with a few drops of acetic acid. The initial dose should never exceed one-twelfth of a grain for weak individuals, and for aged patients the dose should be lessened; for children the same precautions are necessary as for morphine. When immediate results are requisite the hydrochloride given hypodermatically is satisfactory. Watery solutions are used, 2 per cent. solutions in doses of four to eight minims (twelfth to a sixth of a grain). For internal use the dose of the hydrochloride is somewhat larger. Both heroine and its salt can be given in combination with other drugs, the only incompatible being apomorphine. Alkalies must not be added to solutions of the salt. The drug has been found useful as an anodyne in neuralgia of the trifacial nerve, enteralgia, and hemicrania. After prolonged use the dose requires to be increased somewhat. No bad effects have been reported from its use even in advanced car-

diac disease. In painful affections it is inferior to morphine and codein. In irritating lesions of the respiratory tract it is decidedly inferior to the other alkalies. In dyspnœic conditions heroine acts on the respiration as does digitalis on the heart. Asthma is much benefited. Sometimes expectoration is lessened, and Leo recommends the addition of iodide of potash. This combination is very effective. Hypodermatic injections of heroine hydrochloride cause no bad local effects if the usual precautions are observed. Injections were painless. Untoward effects followed in two instances—namely, nausea, depression, and vertigo, lasting a short time. Sedation following these hypodermatic injections is marked in a great variety of affections. The drug is useful in the cure of morphinism. It is substituted for morphine, which is wholly withdrawn, and then the dose of heroine is reduced gradually. No digestive disturbances follow. A few instances of constipation are reported, and for such patients half a grain of cascara sagrada may be added to each tablet. For its local soothing effect heroine can be applied topically on tampons in glycerin solutions or in vaginal suppositories (sixth to a quarter of a grain in cocoa butter). Pain is much lessened in a few minutes. The effect lasts a full day or more, though the tampon be retained but a few hours. In pertussis it is invaluable (Goldmann). In influenza heroine shortens the course and lessens the tendency to bronchopneumonia. It may be administered with a mild expectorant.—*New York Medical Journal*, 1900, vol. lxxi., p. 51.

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**Tannigen.**—Dr. Carl Manasse claims excellent results from the use of this remedy in intestinal catarrh. For nurslings, two and one-half grains; for older children, four to five grains, three or four times daily, arrest the diarrhœa, and in three or four days the discharges become normal. Its use is claimed to be without untoward effects. Eighteen instances in support of this statement are cited.—*Therapeutische Monatshefte*, 1900, Heft 1, S. 27.

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**The Therapy of Cacodylic Acid.**—Dr. A. Gautier gives the following formula: Acid cacodylic, 75 grains (this to be exactly saturated with sodium carbonate); then add cocaine hydrochlorate, 0.5 grain; creosote (dissolved in 2 drachms of alcohol), 5 drops, and distilled boiled water enough to make 3 ounces and 1 drachm. This contains 0.75 of a grain of cacodylic acid in each 15 minims. It is recommended as a substitute for arsenical preparations, especially in phthisis. Subcutaneous injection is painless. All the objections to arsenic, as such, disappear, and in this latent, organic form it can be given, avoiding the various toxic effects resulting from a continued use of arsenic. In addition to the physiological action of arsenic when given in this form, a hyperleucocytosis (especially polynuclear) results, which rids the system of toxic bacteria. The red blood-cells are also increased prodigiously, oxidation is augmented, and thus the blood and tissues are constantly strengthened and renewed.—*Revue de Thérapeutique*, 1899, No. 13, p. 433.

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**Serotherapy in Tuberculosis.**—Dr. C. P. Ambler recommends antituberculous serum in the incipient stage, and especially when there is no mixed infection. The use of the serum is contraindicated in general miliary

tuberculosis, in extensive softening, high pulse, marked emaciation, or where there is an hereditary history. Relapses during treatment and afterward are less frequent than when patients are treated with creosote and allied drugs. Night-sweats are more easily controlled. Expectoration greatly increases during the first two weeks, and rapidly diminishes thereafter. When the disease is far advanced or cavity-formation is extensive the beneficial effect on the expectoration is absent. Injections were continued on an average of ten weeks among those patients discharged as cured. A local erythema in half the patients appeared about the point of injection. Rarely the eruption became general. After the first week no local disturbance followed the injections. When enlarged lymphatic glands are present increase in size occurs, and there is marked tenderness; if the glands are not caseous they slowly diminish in size after two weeks, and wholly disappear. A serious symptom is sudden syncope following the injection of the serum. It often lasts as long as two minutes, and occurs in 5 per cent. of all patients. The face is flushed; it is soon followed by pallor, cardiac weakness, nausea, and vomiting—symptoms probably due to the accidental injection of the serum into a small vein, and not to repetition of the injections at the same point. A recumbent position soon restores the patient, and there are no subsequent ill effects. The first injections do not exceed 3 minims, and are gradually increased to 7 or 8 minims; after some days 15 minims are given at a dose, rarely more. Injections are administered daily in the loose skin above the crest of the ilium, using a small hypodermatic needle. Fisch's antiphthisic serum T. R. gave the best results. Antistreptococcic serum, in addition, where there is mixed infection, has not been successful—not influencing the presence of streptococci, which often disappeared without this second serum, and remained in severe infections, though both sera were injected. The conclusion reached is that antituberculous serum is certainly useful in the incipient stage of pulmonary tuberculosis.—*Journal of the American Medical Association*, 1899, vol. xxxiii., p. 64.

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**Pulmonary Tuberculosis Treated by Aniline Inhalations.**—Dr. Gibert gives the following formula: Crystallized carbolic acid, 22½ grains; boric acid and tincture of peppermint, 2 drachms each; pure white aniline, 4 drachms; distilled water, 3¾ ounces. Deep inhalations of this mixture (from ten to twenty) are to be taken every half-hour, and as many as three hundred in a day. Several spoonfuls of the above mixture are placed in a flask arranged with tubes in such a way that the height of the fluid is not much above the tubes. Agitation of the flask emulsifies the fluid, and the air in the tubes is ready for inhalation. If irritation of the throat results, equal parts of borated water and aniline oil may be substituted. In addition, to cause a general antisepsis, thrice daily three to fifteen drops of aniline in a little water are administered. To keep the temperature regularly low, fifteen to twenty grains of acetanilid are given daily. This medication is indicated when the temperature reaches 99°. Following the inhalations cyanosis of the face and extremities was marked in one patient; the pulse remained slow; there was occasional vertigo. These symptoms soon disappeared. The beneficial results were: pulmonary signs much improved in two weeks, no râles remaining; expectoration was much reduced; appetite became normal;

diarrhœa vanished; weight increased rapidly; temperature was never above 99°. In addition to local antisepsis thus obtained, the stomach is not deranged by drugs and can tolerate more food.—*Le Nouveau Montpellier Medical*, No. 27, p. 27.

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**Treatment of Acute Broncho-pulmonary Affections.**—Dr. E. Corgier calls attention to the value of creosote carbonate, which possesses all the advantages with none of the disadvantages of creosote. Naturally, it is more effective in recent and mild infections. In simple instances of bronchitis with fever, acute pulmonary congestion, pneumonia, or broncho-pneumonia of moderate intensity, especially when the remedy is administered at the onset of the disease, the fall of temperature is rapid, without secondary rise; the auscultatory signs disappear and the general condition improves. In more severe disease—pneumonias or broncho-pneumonias of more intense infection—the effects of the drug are marked. The fall of temperature is rapid, possibly followed by a temporary rise upon later doses. This fall is more sudden in lobular than in lobar pneumonias. It goes without saying that in advanced forms, as gray hepatization, the antiseptic effects may be wanting. After all physical signs have disappeared it is well to continue the remedy for several days. The expectorants, as kermes mineral, or ipecacuanha and the antipyretics, and especially enemas, are discarded. Counter-irritations in the form of baths or wet packs are possibly allowable. Heart stimulants are used if indicated, but cardiac weakness does not forbid the use of the remedy, but rather the contrary. The remedy does not disturb the alimentary tract. In shortening the disease and preventing relapses the dangers of consecutive infection of kidneys and heart, tuberculosis, and gangrene are lessened.—*Inaugural Thesis*, 1899 (Montpellier).

[The extension of the use of this remedy to conditions other than tuberculous, and its use in the treatment of acute infections of the respiratory tract, is worthy of attention. Considerable personal observation emphasizes the plea of the author.—R. W. W.]

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**The Treatment of Pneumonia.**—Dr. H. A. Hare believes that abortive treatment is indicated in sthenic patients only, and recommends a hot foot-bath, hot or cold compress on the chest, depending on the temperature, tincture of veratrum viride, in 3 minims, three doses, being given at fifteen-minute intervals, and sufficient Dover's powder to lessen painful cough and to increase diaphoresis. Such treatment is not indicated after the first twelve hours. Early venesection is condemned, as it weakens the patient against exhaustion occurring later, by depriving him of valuable blood. When consolidation has taken place, hyperpyrexia is prevented by cold sponging, with friction, an ice-bag over the heart and to the head. Antipyretic drugs are too depressant; they also decrease vascular tone and the activity of the blood-cells.

Circulatory stimulation, if really needed, is best obtained with digitalis. It often fails because of high fever; if this latter be reduced by hydrotherapy, digitalis is most efficient. Response to the drug is so slow that 10 or 20 minims of the tincture should be given hypodermatically; its effect is so lasting that twelve to twenty-four hours may elapse before repetition is

necessary. By this method the shuttle-like pulse of overdoses of digitalis is avoidable. When there is a relaxed and gaseous pulse, tincture of belladonna in 5 or 10-minim doses every four or five hours is useful, especially if the skin be relaxed. Strychnine is indicated when the patient is rapidly sinking, by its action as an irritant to the nervous system. It is to be used freely during this period, and then stopped, for strychnine simply goads the system to increased endeavor and does not aid it simultaneously. For prolonged collapse or tendency thereto, wine of cocoa is valuable. In sudden collapse, strychnine and atropine combined are admirable. Brandy is useful in patients advanced in years. Nitroglycerin is indicated only where the pulse is of high tension; where venous engorgement is great, venesection is much to be preferred. Oxygen is recommended when respiration is difficult; it quiets the patient, largely by its mental effect.—*The Therapeutic Gazette*, 1899, No. 7, p. 445.

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**Gastro-intestinal Antisepsis.**—Dr. James Mills advises in gastro-enteric infections emptying the stomach and cleansing the bowels with laxatives and enemata. Approximately sterile food is recommended. Drugs for intestinal antisepsis must be non-absorbable and non-toxic, in such doses as will cause antisepsis; they must, therefore, be insoluble. Castor oil, bismuth salicylate, iodoform, calomel (which becomes mercuric chloride in the stomach), guaiacol carbonate, and naphtalin are recommended. Salol is valuable, becoming salicylic and carbolic acid under the action of the pancreatic juice. Betanaphtol is preferable, for it is non-toxic. Resorcin is useful. Benzonaphtol has no action on the gastric secretion, and is an excellent intestinal antiseptic, 60 grains daily, in divided doses. Digestion is undisturbed by this drug.—*The Medical Standard*, 1899, vol. xxii., p. 268.

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**Diphtheria and its Treatment.**—Dr. Bonnefiu sums up results, after an exhaustive study of statistics, as follows: Isolation of patients and systematic disinfection of wards every fortnight have caused great diminution in the frequency of this disease; this change occurred two years before the introduction of antidiphtheritic serum-therapy, and has been due to the above procedures.—*Journal de Médecine*, 1899, vol. xi., No. 25.

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**Puerperal Fever and Antistreptococcic Serum.**—Dr. D. Arthur, after using uterine bichloride douches, quinine and perchloride of iron by the mouth, the patient being almost moribund, on the eighth day after delivery injected 150 minims of antistreptococcus serum daily for three days. In nine days eight injections of serum were given, their administration being governed by the height of the temperature. When apyrexia had existed for five days another injection was given; antitoxin poisoning resulted, with a slight urticarial rash, diarrhœa, and rectal hemorrhage. Complete recovery ensued. It is recommended that a single injection be given daily until apyrexia is established.—*British Medical Journal*, 1899, No. 2010, p. 78.

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**Septicæmia and Antistreptococcus Serum: Rapid Recovery.**—Dr. J. M. Bruce, from results with the serum in two instances, concludes: 1. Antistreptococcus serum may succeed when other measures have failed. 2. It

may act with great rapidity, all the symptoms disappearing in two days. 3. Success may attend the use of one serum after another preparation has failed, and on this last point much stress is laid.—*The British Medical Journal*, 1899, No. 2010, p. 76.

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**The Treatment of Syphilis.**—Dr. D. Tait bases the intravenous method on the fact that mercury has no effect on the organism until it enters the blood, the leucocytes being the exclusive vehicle and agent of absorption. Mercuric cyanide, 1 part in 100 or 200, and corrosive sublimate, 1 part in 500 or 1000, are generally used. The amount injected daily should be from 15 to 45 grains. The skin over the flexor surface of the elbow is cleaned and the arm is constricted by a rubber bandage. Any prominent vein is chosen, the hypodermatic needle being introduced obliquely; the bandage is loosened. If a medium-sized needle be used, blood enters the barrel and makes certain that the needle-point has penetrated a vein. The patient should feel only the skin puncture. If any of the solution passes into the cellular tissue round about intense pain results, and induration follows, lasting several weeks. Extravasation of blood is avoided by using a needle of not too large calibre. In adipose patients and in women, the veins cannot always be made sufficiently prominent to perform the puncture. No dressing is required [?]. Experiment has shown that no thrombus occurs in the punctured vein. Repetition of puncture in the same vein causes no local or general disturbance. Mercuric cyanide is preferred to corrosive sublimate, as it contains a higher percentage of mercury (80 per cent.). Thus exhibited, mercury appears in the urine in ten minutes, and continues to be present for only thirty-six hours. Blood examination, after small diluted doses, shows an increase of red corpuscles and hæmoglobin, with hyperleucocytosis; with large doses the condition is reversed, hyperleucocytosis immediately resulting. Thus mercurial anæmia may be rapidly controlled. The injection of calomel is to be avoided, for pain, nodules, and suppuration are frequent results, and the amount of mercury thus absorbed is uncertain. It is recommended that the intravenous injections be made daily at the elbow. This method is for exceptional use, when ordinary measures have failed, as in syphilitic glossitis and phagedenism, and where *rapid* mercurialization is required. Tertiary syphilis of the eye, tongue, and nervous system, and primarily malignant syphilis are amenable to this form of treatment. In differential diagnosis intravenous injections are invaluable for their rapidity and accuracy.—*The Journal of the American Medical Association*, 1899, vol. xxxii. p. 1361.

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**Protargol in Gonorrhœa.**—Dr. W. L. Baum, following the method of Neisser, thus recommends the use of protargol: 1. Having determined that the urethritis is still confined to the penile portion of the urethra, instruments are not passed beyond the anterior urethra. 2. If there is posterior urethritis, often where prolonged anterior injections are used, it is unnecessary to inject the posterior urethra. 3. Injections to be given thrice daily, after urination. The fluid is to be retained five minutes in the urethra after the first two injections, thirty minutes after the third. If much secretion is present, six injections, each of five minutes' duration, may replace the latter. 4. After a few days the prolonged retention of injected fluid should

be discontinued. The other two are replaced by an injection of a suspension of bismuth or iodoform, 2.5 per cent. each, or boric acid solution, 3 per cent., or zinc sulphate, one-quarter of 1 per cent. When gonococci can no longer be discovered the injections are stopped. It is best to begin with one-quarter of 1 per cent. protargol solution, which is gradually increased to 1 per cent. Chronic gonorrhœa is often much benefited by these mild solutions. The protargol solution is not precipitated by albumin, and penetrates deeply into the urethral tissues. Thus treated fifty patients responded very satisfactorily, there being few complications.—*Medicine*, 1899, No. 7, p. 555.

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**Myxœdema Treated with "Colloid" Material.**—Dr. R. J. M. Buchanan reports a case treated with colloid material prepared from the thyroid gland according to Hutchinson's formula, each tablet being the equivalent of five grains of the fresh gland. Beginning with 5 grains the dose was gradually increased until 20 grains a day were taken within one month. Dosage was then reduced to 10 grains, and after four months to 5 grains a day. There were no symptoms of thyroidism. Result was a rapid return to health. Complete alopecia was followed by a growth of thick, brown hair. Pulse and temperature became normal. Perspiration returned and the mental inactivity disappeared. Body-weight diminished. Drowsiness vanished, and appetite increased. The patient continued to take 5-grain doses daily, and remains in excellent health. With the loss in weight there was an increase in urea excretion at first, and then, though the weight continued to decrease, the urea diminished in quantity, and at this time the maximum dose of "colloid" was being administered.—*The British Medical Journal*, 1899, No. 2007, p. 1460.

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**Septicæmia Treated with Normal Salt Solution.**—Dr. C. E. Edson states that the patient was subject to follicular tonsillitis, which, in the present instance, was replaced by the typical sore-throat of streptococcus infection. Constitutional symptoms followed, with aggravation of pain in the joints. Salicylates, alkalies, and anodynes were ineffectual. After a fortnight, the conditions all gradually growing more grave, sixteen ounces of hot sterilized salt solution were injected into loose tissues about the breast. Increase in urine was noticeable. Next day twenty-six ounces were injected into the median cephalic vein, and later eighteen ounces were injected under the pectoral muscle. A last injection of fourteen ounces was given two days later. Convalescence slowly appeared, and recovery was complete. Attention is directed to the great relief of pain following the injections. This, and improvement in nervous symptoms, resulted after each injection. Later the intense pain and restlessness would recur. Until the first administration of saline solution the patient was rapidly failing. Free diuresis and diaphoresis occurred after each injection. Apparently as beneficial results followed hypodermoclysis as venous infusion.—*Boston Medical and Surgical Journal*, 1899, vol. cxli., p. 83.

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**Diet in Typhoid Fever.**—Dr. R. W. Marsden recommends milk only at first. When the infection is mild on successive days bread and milk, with custard, fish with mashed potato, chicken, bread and butter, and, finally,

minced meat are allowed, nothing further until convalescence is well established. Patients gravely ill should be given only peptonized milk with meat-juice until well into the period of convalescence. Slight exacerbations of temperature and occasional irregularities of the bowels are not indications for the withdrawal of food. The patient's own wish is an important guide. The typhoid state being passed, and the tongue being moist, food is indicated when asked for. The various injurious consequences of a too early administration of solid food have been stated as (1) Diarrhœa. Etiology being considered, it is probably proportionate to the severity of the attack; it has not a necessary relation to the extent of the intestinal lesions; it is worse when the colon is ulcerated; it is due to the associated catarrh. The last factor is the only one capable of influence by feeding; the occurrence of vomiting, unusual abdominal fulness or uneasiness, and increased action of the bowels are supposed to result. In two hundred patients fed according to the above plan there was total absence of vomiting and abdominal discomfort. In only three patients diarrhœa increased, but it apparently was not due to feeding. (2) Hemorrhage. It is more common in the severe infections, being due to the separation of the sloughs or to the presence of funigating sloughs, or to the associated hyperæmia. In the same series of cases 3 per cent. of hemorrhage is reported, none being fatal. Most copious hemorrhages are met with chiefly in the worst attacks with much diarrhœa, and in such instances an advance to solid food has not been made. (3) Perforation. In the writer's series it did not occur, yet this complication is supposedly most prevalent as a result of the use of solid food. The only connection is through the mechanical irritation of ulcers. (4) Pyrexia. It is well recognized that very great variations in temperature may occur in patients who are kept on a milk diet. An exacerbation at the time of giving solid food is most often a coincidence, unless the change has been made too suddenly. If the exacerbation is temporary and unaccompanied by other symptoms, starvation diet is not justifiable. (5) Relapses occur. After irregular intervals and if it cannot be ascribed to the giving of solid food, a relapse is due to a reinfection of the blood, for intestinal lesions are found far advanced out of proportion to the obvious clinical relapse. Therefore, there is less chance of its being due to solid food when the relapse immediately follows than where a fortnight has intervened after taking solid food. To recommend the above alteration in the typhoid dietary are more rapid recovery, diminished risk of surreptitious feeding, lessened tendency to bolt food when allowed, without mastication, and diminished tendency to asthenic complications, such as post-typical anæmia, gangrene, etc.—*The Lancet*, 1900, vol. i. p. 90.

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**Ichthalbin.**—Dr. Samuel Wolfe finds that this substance, which is ichthyol albuminate, clings closely to mucous membranes, and thus gives a prolonged application. In diphtheria seven to fifteen grains have been blown into the throat at intervals of three to four hours with excellent results. In order to obtain a further action upon the gastric and intestinal mucous membrane, tablets, each containing five grains, may be employed, of which four to ten may be taken daily. The following conclusions are presented: 1. Ichthalbin is non-toxic and non-irritant to the stomach, admitting, on this account, practically unlimited dosage. 2. It is an intes-

tinal antiseptic, a stomachic, and an aid to constructive metabolism. 3. It has no odor and almost no taste, properties which make it easy of administration without combination or disguise. Whenever ichthyol is indicated for local use, but when a dry, odorless powder is more easily applicable or otherwise preferable, ichthalbin should be used. Internally, the latter is preferable because it will not cause irritation, will not nauseate, is more pleasant to the taste, and can be administered in more efficient doses. In phthisis, secondary and tertiary syphilis, chronic rheumatism, and septic and pyæmic conditions, it is among the most available drugs. In all conditions of the mucous membranes where hyperæmia, increased and perverted secretion, or suppuration appears, it is decidedly efficient. In florid and inflammatory dermatoses it is among the best internal remedies.—*Merck's Archives*, 1900, No. 1, p. 9.

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**The Use of Ichthyol-vasogen in Diseases of the Joints.**—Dr. G. Edlefsen notes that inunction is important so that the medicament may penetrate to the deeper tissues. An instance of presumably tuberculous tarsus is cited in which complete relief of disability was obtained in a few weeks by the use of this substance (10 per cent.) twice daily. In monarticular rheumatism, particularly in recent disease, good results are obtained. Energetic massage is important. In the polyarticular variety there is marked lessening of the pain and increased mobility of the affected joints. Should the rubbing increase pain the older methods of painting on the alcohol-ether-ichthyol solution may be resorted to. Internal use of ichthyol in pill or capsule is advantageous. For this method the claim of a real addition to our therapeutic resources is made.—*Therapeutische Monatshefte*, 1900, Heft 1, S. 19.

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**The Action Upon the Renal Function of Hypnotics Associated with Diuretics.**—Dott. T. Pirocchi, having reviewed the literature, attempts to ascertain from laboratory investigation (1) if chloral increases the diuretic power of other substances reputed to be capable of promoting a greater secretion of urine; (2) if other narcotics, not studied from this point of view, can, united with diuretics, produce the same effect as chloral; (3) to establish what may be the mechanism of such action; and (4) how much of the diuretic effect of drugs known as diuretics is really due to them, and how much to the narcotics used with them in experimental work. The diuretics chosen were caffeine, potassium nitrate, sodium nitrate, diuretin and arbutin; the hypnotics were chloral and duboisine sulphate. The conclusions reached were that chloral constantly increased the diuretic action of caffeine and arbutin, sometimes, but not always, that of diuretin and potassium nitrate, but has no effect in conjunction with sodium nitrate. As to whether other narcotics increase the action of diuretics as does chloral the researches of Cervello and Lo Monaco prove this to be true for curare and paraldehyde, and these observations add duboisine sulphate to the lists. These prove that duboisine sulphate always increases the diuretic action of caffeine, sodium nitrate, diuretin, and arbutin, and sometimes that of potassium nitrate. The mode of action of the associated hypnotic and diuretic is explained by a new hypothesis which will be presented in a future study. To determine how much diuretic effect is obtained as diuretics, *per se*, and how

much comes from the associated narcotic, the following statements are made: Caffeine, itself a weak and uncertain diuretic, is reinforced by narcotics. All of the diuretic effect attributed to sodium nitrate, potassium nitrate, and arbutin is due to the narcotic. A part of the diuretic effect of the diuretin is due to the narcotic; but, on the other hand, this remedy acts vigorously upon the renal secretion. So far as these experiments go there is practical advantage in the following associations: chloral and caffeine, chloral and arbutin, duboisine sulphate and diuretin, duboisine sulphate and sodium nitrate, duboisine sulphate and arbutin.—*Il Policlinico*, 1900, No. 1, p. 51.

**Chloretone a Safe Hypnotic.**—Dr. W. M. Donald discusses trichlor-tertiary butyl alcohol or chloretone. It is made by adding caustic potash to equal weights of chloroform and acetone. It occurs as white crystals, with the odor of camphor. Slightly soluble in water, it easily dissolves in alcohol and ether. The tablet form is best for internal administration. It is especially recommended as a hypnotic and local anæsthetic. There are no depressing after-effects, and it is safe to administer large doses. Ten to fifteen grains, repeated in two hours if necessary, is the usual dose. One hundred and twenty grains have been taken in a single day. Profound narcosis followed for forty-eight hours; then inco-ordination of muscles, with diarrhœa. Mild general anæsthesia (absence of response to pin-pricks) lasted several days.

Nearly a week elapsed before the patient ceased to show effects from the drug. The pulse remained slow. Respiration was deepened, but the rate remained normal, likewise the quality and rhythm. Toward the end of the long sleep temperature became subnormal from exhaustion. Sleep was continuous for nearly a week, except when the patient was roused for nourishment and baths. During these periods he became partially conscious, later referring to incidents occurring during these intermissions. Gastric irritability was due as much to fasting as to the drug.—*The Therapeutic Gazette*, 1900, vol. xvi., No. 1, p. 18.

## OBSTETRICS.

UNDER THE CHARGE OF

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**Eclampsia followed by Toxæmia in a Succeeding Pregnancy, with the Death of the Ovum.**—In the *Transactions of the Obstetrical Society of London*, 1899, vol. lxi. p. 151, Griffith and Eden report the following case:

The patient, a multipara, had eclampsia at the eighth month of her third pregnancy. Labor was induced by the introduction of the bougie, and the patient recovered. She became pregnant eighteen months afterward, and

five weeks after the beginning of the pregnancy she had severe lumbar pains, swelling of the legs and face, a large amount of albumin in the urine, with the nervous phenomena of toxæmia. The uterus was immediately emptied by rapid dilatation and the removal of the ovum.

The detailed report of the examination of the specimens may be summarized as follows: The decidual cells showed myxomatous and fatty degeneration. The changes in this tissue were so widely distributed and so well marked as to suggest that this structure was first affected, and later the chorion. In the chorion the cells showed similar changes to those in the decidua, with a considerable deposit of fat in the villi, which could not be definitely proven to be pathological. It seemed probable that the ovum was engrafted upon an endometrium made unhealthy by the condition of the mother's excretory organs; that the decidua became affected by the same changes present in the endometrium, and that as a result a morbid condition of the fœtal membranes ensued, resulting in the death of the embryo.

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**Indentation of the Fœtal Head by the Sacro-promontory.**—In the *Scottish Medical and Surgical Journal*, November, 1899, BARBOUR publishes a paper upon this subject. He reports three cases, the first a flat rhachitic pelvis, with a conjugate of three and a quarter inches. The head was transverse and the occiput to the left side of the pelvis. Version was performed, and upon examining the fœtal head a vertical furrow was found in front of the right ear. This was above the ear, in the temporal fossa, and at one end of the bitemporal diameter. As this is the shortest transverse diameter of the head, and as version was performed to bring this diameter in relation with the antero-posterior of the contracted brim, it is natural to expect evidence of compression at one extremity of this diameter. A vertical direction of the furrow is explained by the fact that the head passed the brim in the position of extension.

In the second case the child was delivered with axis-traction forceps through a contracted brim. The head was high above the pelvis, and the bladder was greatly elongated. The external conjugate was seven inches, and the internal antero-posterior diameter three and a half. The head presented in the usual manner, and after a long and tedious labor the head descended sufficiently far to make the use of forceps possible. The cranium was greatly elongated, and above the left orbit was an indentation, showing the pressure of the promontory of the sacrum.

In the third case the pelvis was flattened, and the promontory projected very markedly. The pelvic measurements were not kept in this case. Labor began as a brow presentation, with the occiput toward the right side. Extension continued, and the head thus passed through the pelvis, the vertex being greatly flattened, and the occipito-frontal diameter of the head being much increased. A horizontal groove was found above the right ear. This showed that the occiput had rotated posteriorly and that the back was to the right, thus bringing the right side of the fœtal head against the sacrum.

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**Rectal Carcinoma During Pregnancy, with the Induction of Labor.**—MACVIE (*Scottish Medical and Surgical Journal*, November, 1899) reports the case of a multipara who had suffered much from constipation. At the sixth

month of pregnancy, after taking a laxative, she was seized with pain and bearing-down, straining tenesmus. Upon examination the cause of her suffering was found to be an obstruction of the rectum through a malignant growth. When the bowels were emptied by lavage the pain ceased. After consultation it was determined to allow the pregnancy to go on and to perform Cæsarean section. Her sufferings, however, increased considerably, and it seemed impossible to keep the bowels free. It was then determined to induce labor very gradually by inserting a bougie into the uterus. This was done, and when labor came on chloroform was administered for three hours, the head gradually passing the malignant growth and being born in spontaneous labor. The patient made a good recovery from the labor, and six weeks afterward a recto-vaginal fistula developed, which relieved the occlusion of the intestine. The child died of enteritis shortly afterward.

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**The Early Diagnosis of Pregnancy.**—At a recent meeting of the Obstetrical Society of Vienna, BRAUN (*Centralblatt für Gynäkologie*, 1899, No. 17) called attention to a sign of early pregnancy, which he had found of great use in making the diagnosis. As is usually the case, he laid stress upon the presence of cholesterin in the breast and in changes in the color of the genital canal. The sign which he had found especially important consisted in unilateral development of the uterus, whereby upon examination one-half of the womb is felt larger than the other, especially near the cornu, while a sulcus can be distinctly felt running lengthwise between the two portions.

In discussion, SCHAUTA mentioned cases in which the ovum had lodged in one cornu of the uterus, which simulated ectopic gestation. In these patients the tumor was considerable in size, and exactly the consistence in extra-uterine pregnancy.

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**The Conditions Favoring the Passage of Soluble Substances Between the Mother and the Fœtus.**—In the *Lyon Médicale*, 1899, No. 6, GUINARD and HOCHWELKER give the results of experiments which they have conducted to determine the passage of soluble substances from mother to child. Their results agree largely with those of other observers, to the effect that soluble substances, such as diffuse coloring materials, poisons, and toxins injected into the fœtus can pass into the organism of the mother. The opposite is also true. There is, however, one condition which must be present, and that is that the fœtus must be living; otherwise there can be no transmission from one to the other.

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**Two Cases of Cæsarean Section with Transverse Incision of the Fundus.**—In the *Centralblatt für Gynäkologie*, 1899, No. 12, CRYZEWICZ reports two Cæsarean operations with transverse incision of the fundus as follows:

The first case was that of a rhachitic dwarf, aged twenty-four years, upon whom Cæsarean section was performed at the beginning of labor. Hemorrhage was controlled by compression by the hands of an assistant, and a living child as easily extracted. The wound was closed with seven deep

stitches which passed through the entire wall of the uterus. Sterilized silk was used. Iodoform gauze was passed through the uterus into the vagina as a drain. The patient made a good recovery, complicated by slightly foul lochia for a few days and by very slight suppuration in the abdominal wall.

Case second was also a rhachitic patient, who had been delivered by Cæsarean operation some time before. She was brought to the hospital in labor, and, fearing rupture of the uterus from labor pains, which were strong, the second Cæsarean operation was performed. On opening the abdomen, which was not done through the old scar, strong and wide adhesions between the uterus and the abdominal wall were found through the whole length of the first incision. When these were separated a white, glistening scar was seen in the uterus, and the anterior wall of the womb was found considerably thinned. Nothing was seen of the sutures employed in the former operation. The second operation proceeded readily, and the placenta was found upon the anterior wall underneath the old scar, and the finger could be passed between the scar and the placenta. It was possible after removing the placenta to closely inspect the scar, when it was found that the only superficial and sub-peritoneal portion of the uterine wall had united. The womb was closed with buried silk sutures, and the patient made a good recovery.

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**Pyelonephritis Complicating Pregnancy.**—VINAY and CADE (*L'Obstétrique*, 1899, No. 3) describe cases of this condition which they have investigated in a number of patients. They found that during pregnancy there exists a form of pyelonephritis characterized by sudden onset with intense general symptoms. Patients complain of acute pain in the lumbar region, and discharge pus abundantly through the urine. The right kidney is usually affected. It is comparatively easy to distinguish between this malady and cystitis, with which it was for some time confused. It usually attacks the patients at about the fifth month of pregnancy.

As regards the causation, two great factors are present: One, the compression of the ureters by the pregnant womb, and the other infection. This infection sometimes has its origin in the intestine, and finally communicates itself to the kidneys through the medium of the blood.

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**Brow Presentations.**—In the *Centralblatt für Gynäkologie*, 1899, No. 41, SCHATZ gives the results of his experience in these presentations.

He believes that an essential element in causing brow presentation is spasm or stricture of the lower uterine segment. The exact cause of this is difficult to find, as it does not seem to depend upon any condition in the pelvis nor upon the shape of the child's head. In cases where the head is relatively small this cause can bring about a brow presentation. In some instances a rheumatic history is given by the mother.

As regards the treatment of the condition, if the os is partly dilated and the birth cannot proceed, it is well to try to relax the constricted tissue by the external application of warmth, by hot baths, hot packs, or the use of morphia. When delivery must be brougth about he is in the habit of applying the forceps to the sides of the head and converting the presentation into a face, rotating the chin anteriorly as the head descends upon the pelvic floor. If the head is freely movable above the pelvic brim, version is indicated.

# GYNECOLOGY.

UNDER THE CHARGE OF

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**Cystic Perithelioma of the Ovary.**—MIRABEAU (*Monatsschrift für Geb. u. Gyn.*, Band x., Heft 4) infers from a study of his own and recorded cases that perithelioma is a dermoid growth springing from the adventitia of the smaller arteries, identical with so-called endothelioma of the perivascular lymph-spaces and of the lymphvessels and bloodvessels. All these neoplasms are derived from the mesoblast and are to be sharply distinguished from angiosarcoma. Endothelioma and perithelioma present two distinct types, the cystic-papillary and solid tubular; these may be combined with dermoids. With regard to the clinical history of perithelioma, the writer deduces from an analysis of the twenty-five reported cases that 84 per cent. were found in women over fifty years of age, although two of the patients were under ten and five between ten and twenty years. Nearly one-half of the patients were virgins or nulliparæ. No characteristic symptoms were noted. Ascites was noted in a few cases, but œdema of the abdominal wall or lower limbs was not observed. In some of the most marked cases only one ovary was affected. The malignancy of the growth is unquestionable; in fact, 40 per cent. of the patients died soon after operation. Twelve made a good recovery, and one was reported well four years after removal of the tumor. As in the case of all malignant growths, the prognosis depends upon the stage at which operation is performed and its thoroughness.

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**Drainage and Peritonitis.**—SIPPEL (*Ibid.*), after repeating the usual statements with regard to the absorptive power of the peritoneum, emphasizes the importance of saline irrigation as a means of diluting toxins and removing secretions which serve as culture-media for bacteria, drainage serving to supplement this agent. Irrigation acts in no sense as a disinfectant, but certainly retards infective processes by diminishing the number of germs and thus lowering their activity.

The writer still uses glass drainage-tubes, principally to prevent compression of the gauze by the edges of the abdominal wound, which hinders the free escape of fluid by capillary action.

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**Stypticin in Uterine Hemorrhage.**—FALK (*Ibid.*) infers as the results of experiments on animals that the hæmostatic action of this drug is not due to its action on the uterine muscle, so that it may be safely administered to pregnant women. Contrary to hydrochlorate of hydrastinin, it does not cause contraction of the vessels, but slowing of the blood-current, in which respect its action resembles that of opium. In short, it is a narcotic rather than a styptic, as shown by its sedative effect when administered to animals.

This opinion is borne out clinically by the fact that the most satisfactory results from the use of stypticin are obtained in cases of menorrhagia in

anæmic girls and in women at the climacteric, in which the hemorrhage is not directly due to a local condition, such as fibromyoma or marked endometritis. Some cases of menorrhagia accompanying diseased tubes and ovaries were relieved by the drug, while in others which appeared to be identical in character the results were negative.

The writer agrees with Freund that stypticin is not a specific. He has never observed permanent relief from its use, while the local cause of the hemorrhage remained. In this respect it is of far less value than hydrastinin. Both drugs act more promptly and surely when administered hypodermatically.

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**Supravaginal Amputation of the Uterus in Disease of the Adnexa.**—FRITSCH (*Ibid.*), after trying the usual methods of dealing with suppurative disease of the adnexa, arrives at the conclusion that they are all more or less unsatisfactory. Incision and drainage do not effect a radical cure. Vaginal extirpation of the uterus is often followed by persistent pains due to intestinal and omental adhesions, or by shortening of the vagina and interference with coitus. He now adopts the same plan as in the removal of uterine fibromyoma—viz., the uterus is first amputated and adhesions and pus-sacs are dealt with afterward, drainage being dispensed with.

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**Atmocausis and Zestocausis.**—PINCUS (*Ibid.*) admits that intra-uterine cauterization is not free from danger, and requires special skill. The best results are obtained when the patient is not anæsthetized. Careful diagnosis in each case and thorough dilatation and protection of the cervix are important. It is possible to regulate the degree of cauterization, whether superficial or deep, by the temperature of the steam and the duration of the period of application. The rule should be to use the highest possible temperature with the shortest possible application. If it is repeated it is better to wait four weeks until the endometrium has been entirely renewed.

From an analysis of 833 observations the writer states that atmocausis is a specific in uterine hemorrhages from any cause, and is especially valuable in all forms of endometritis. When it fails it is in cases in which the uterus has lost its contractile power.

Steam is the best palliative agent in inoperable carcinoma, and may be used with advantage to disinfect the uterine cavity previous to total extirpation; also in puerperal septic endometritis when the infection is confined to the uterus.

It is absolutely important to exclude disease of the adnexa before beginning the treatment. The advisability of using atmocausis in acute gonorrhœa and in other acute inflammatory conditions of the uterus is still subjudice.

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**Treatment of Intraligamentary Tumors.**—PETROFF (*Wratch; Annales de Gyn. et d' Obstétrique*, 1899, No. 10) calls attention to the fact that the usual method of dealing with bleeding surfaces between the broad ligaments after the enucleation of tumors is unsatisfactory. When the sac is sutured to the abdominal wound and is drained, recovery is often protracted, while Lebedeff's plan of ligating it in sections is not always feasible, since

one of the peritoneal folds may be so thin that it is removed with the neoplasm. Moreover, adhesions are apt to form between the stump and the intestines or appendix.

He suggests the following method, which he has practised successfully: After incising the broad ligament transversely and enucleating the tumor, the anterior flap of peritoneum was preserved, while the posterior was removed with the growth, leaving an extensive bleeding surface. The posterior fornix is then incised (the finger being introduced into the vagina as a guide), and the peritoneal flap is drawn through into the vagina, completely covering the raw surface, which thus becomes extraperitoneal. The vaginal incision is then closed. In case suppuration should occur the pus is shut off from the peritoneal cavity and can be easily evacuated per vaginam.

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**Relation Between Menstruation and Pulmonary Tuberculosis.**—NEUMANN (*Berliner klin. Wochenschrift*, 1899, No. 21) has established the following facts with regard to this relationship: 1. In many tubercular patients the temperature-curve is always higher during menstruation. Such an elevation in a patient with no pulmonary symptoms should always awaken suspicion, especially if she feels quite well during the intermenstrual period. 2. In patients with marked pulmonary disease the local signs may become aggravated during menstruation, without increased fever. If this phenomena is noted every month the prognosis is correspondingly grave. Such exacerbations are sometimes noted in cases in which the healing process is advancing rapidly, as shown by the reappearance of râles during menstruation. 3. In suspected cases, in which no physical signs of pulmonary disease have been previously discovered, latent foci may be detected during the menstrual period. The so-called nervous or reflex cough, often present in this class of cases, is really an evidence of the development of the tubercular process. A few days later the râles may have disappeared and no evidence of trouble can be found. 4. In other cases menstruation seems to exert a favorable influence upon the disease, dyspnœa being greatly relieved.

The practical inference from these observations is that during and immediately after the menstrual period women should be guarded against influences tending to develop a latent tendency to tuberculosis or to aggravate existing disease. Absolute rest should be maintained at this time, even when there is no elevation of temperature. Tubercular patients should not travel during menstruation.

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**Intestinal Obstruction due to Uterine Fibroids.**—GOULLIOUD (*Annales de Gynécologie et d'Obstétrique*, 1899, Nos. 8 and 9) reports two cases of death from intestinal obstruction following supravaginal amputation of the uterus for fibromyomata that had developed beneath the peritoneum, displacing and obliterating the mesocolon. Although the gut was not occluded while the tumors remained *in situ*, the changed relations resulting from suture of the peritoneal flaps caused an angle in the sigmoid flexure which prevented the passage of feces and led directly to the death of the patient.

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**The Corpus Luteum.**—CORNIL (*Annales de Gynécologie et d'Obstétrique*, 1899, No. 10) has devoted considerable time to a review of this familiar sub-

ject. He believes that each of the so-called corpora albicantia represents not a true cicatrix, but a complete destruction of a former corpus luteum which preserves its form and traces of its constituent parts in the ends of the ovarian stroma.

The corpus luteum of pregnancy is not peculiar to that condition, but is found in pathological conditions, either general or local, which are attended with ovarian congestion, as in typhoid fever. In the bodies of women who have died from cardiac disease the ovaries are often found to contain large corpora lutea or to be the seat of follicular hemorrhages.

The writer states that in several instances he has found these bodies in the ovary, especially in connection with uterine fibroids, which could not be distinguished from the corpora lutea of pregnancy.

In cystic ovaries the dropsical follicles invariably contain ripe ova, so that it seems fair to infer that rupture fails to take place at each menstrual period. Such ovaries may contain several corpora lutea of different ages, corresponding to separate periods.

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**Non-puerperal Purulent Metritis.**—PETROW (*Wratch*, 1899, No. 28) reports the case of a nullipara, aged forty-one years, who was suddenly seized with pain in the right side of the abdomen, followed by symptoms of pyæmia, icterus, enlargement of the spleen, and metastatic pneumonia. The patient died eleven days later, and at the autopsy the initial focus of infection was found in the cervix uteri, which contained multiple abscesses. Phlebitis and lymphangitis of the uterine vessels and pus-foci in the left ovary, tube, and pancreatic tissue were also present. Pure cultures were obtained from the pus containing micro-organisms which were either the pyobacterium of Fisher or the bacillus coli commune.

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**The Surgical Treatment of Uterine Fibroids.**—SCHANTA (*Ibid.*), in concluding an article on this subject, summarizes as follows: 1. Surgical interference is indicated only in the case of tumors which give rise to symptoms that cannot be relieved by any other treatment. 2. Vaginal extirpation is the safest and most satisfactory operation, and gives the best ultimate results; it is indicated in all cases of multiple fibromyoma in which the mass does not extend beyond the umbilicus and can easily be drawn down into the pelvis. 3. The abdominal operation is indicated in the case of large tumors with slight mobility, especially the intraligamentary variety. 4. Although supravaginal amputation, with intraperitoneal treatment of the stump, may give better immediate results than total extirpation, the latter is destined to become the preferable method because of the better ultimate results. 5. Supravaginal amputation with extraperitoneal treatment of the stump is useful, especially in cases in which rapid operation is necessary. 6. Vaginal enucleation of sessile intra-uterine growths, or the removal of subperitoneal fibroids by anterior or posterior colpotomy, as well as abdominal myomyotomy, should be reserved for special cases, since the tumors are usually multiple, so that a radical cure does not result; moreover, the danger is no less than in complete extirpation. 7. Curettement of the fibroid uterus is an uncertain therapeutic measure, not devoid of risk, and should be limited to those rare cases in which the tumor is in the early stage of development.

8. Castration will ultimately be abandoned, although it may occasionally be performed in cases in which it is impossible to perform a radical operation. 9. The use of clamps is justified in cases in which rapid work is necessary, but these offer no advantages over ligatures. 10. Drainage is of great value after both vaginal and abdominal extirpation, if there is extensive oozing, since it both promotes aseptic convalescence and prevents the formation of exudates. 11. The question as to the propriety of saving the ovaries is still *subjudice*. Prolapse may occur if they remain. Prolapse of the vagina may follow the operation whether they are removed or not.

**Injuries During Coitus.**—NEUGEBAUER (*Monatsschrift für Geb. u. Gyn.*, Band ix.) has made a careful study of this subject, based on seven personal observations and one hundred and fifty cases collected from the literature. Twenty-two resulted fatally.

The writer believes that these accidents are more common than is ordinarily supposed, and deserve careful study from a medico-legal stand-point. The most common lesions are perforation of the cul-de-sac (thirty-eight cases), longitudinal tears of the posterior vaginal wall (twenty-two), and laceration of the vulva (fifteen). In many cases there is merely an extensive rupture of the hymen, followed by profuse hemorrhage. Recto-vaginal and vesico-vaginal fistulæ have resulted from brutal attempts at coitus. In fatal cases death is usually due to infection, resulting in parametritis and perimetritis, though in a few instances patients have succumbed to hemorrhage.

**Radical Operation for Prolapsus Uteri.**—GOTTSCHALK (*Ibid.*) describes an operation which he performed successfully in a case of prolapsus of twenty-one years' standing in a woman sixty-three years of age. After total abdominal extirpation of the uterus the anterior peritoneal flap was sutured as high up as possible to the posterior wall of the pelvis. The stumps of the round, broad, and sacro-uterine ligaments were then united in order to support the bladder and strengthen the vagina, the latter being contracted by performing anterior and posterior colporrhaphy.

## DERMATOLOGY.

UNDER THE CHARGE OF

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**Lichen Scrofulosorum in the Negro.**—T. C. GILCHRIST (*Johns Hopkins Hospital Bulletin*, May, 1899, No. 98) records a case in which there were about sixty groups of the characteristic papular lesions scattered over the body.

The patient, a healthy girl, showed no traces of tuberculosis, and in the examined sections of the skin no tubercle bacilli could be found, doubt thus being cast upon the tuberculous nature of these lesions.

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**Tuberculosis Cutis Propria.**—E. BLOCH (*Dermatologisches Centralblatt*, January, 1899) thinks a sharp distinction should be made between primary tubercular ulcerations of the skin and other forms of tubercular disease, as lupus vulgaris, scrofuloderma, and the like. The first are rare, the latter common. The reporter records a rare case of tubercular ulceration of the vulva, accompanied with advanced tuberculosis of both lungs and of the intestines. The cutaneous ulcers were extensive, irregular, and superficial, with pale, smooth floors and light grayish nodules. Similar lesions also existed in the neighborhood of the arms. Tubercle bacilli could not be found in the discharge from the ulcers.

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**Pharmaceutical Notes.**—HERBERT SKINNER (*British Journal of Dermatology*, June, 1899) speaks first of the *petroleum preparations* as bases for ointments, calling attention to their greasy and non-drying properties. He thinks that the absorption of the base in ointments is not everything, seeing that mercury ointment, when made with a mixture of soft and hard paraffin, is absorbed more readily than with any other base. The preparations of petroleum are the best fatty lubricators we possess.

The reporter gives the following formula for an excellent *cold cream ointment:* Benzoated lard, ℥iv; white wax, ʒiv; spermaceti, ʒj; borax, ʒss; glycerin, ʒj; cologne water, ℥ijss.

In prescribing *resorcin* care should be taken to avoid a combination with salicylic acid, as the two are incompatible; it is seen especially in a collodion menstruum, less in a fatty one. Resorcin oxidizes rapidly, this being particularly noticeable in ammoniated mercury ointment, the white turning blue-black in a few days.

The following lotion is very simple and often successful in allaying the itching and burning sensations in *urticaria:* Liquor hamamelidis, ℥ij; sal maris, ℥ss; aq., oj.

The following *iodine* preparation will recommend itself by the removal of the staining objection: Iodum resublimatum, gr. xxiv; acidum oleicum, ad. ℥j, It is absorbed much more readily than the others, is very clean in its application, is very soluble, and can be used stronger if needed.

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**Symmetrical Areas of Solid Œdema Occurring in Graves' Disease.**—HOWARD MORROW (*British Journal of Dermatology*, July, 1899) reports a case occurring in a spare, married woman, aged forty-five years. On the front and outer aspect of both legs were symmetrical raised areas of swelling, beginning two inches above the ankles and extending upward seven inches, each area being about three inches wide. The œdema was more marked on the lower than on the upper part; was dense to the trunk, and did not easily pit on pressure; was not tender or painful, and had remained stationary in extent for several months. Under massage during one month the areas became softer. The chief point of interest in the case is the symmetry.

# DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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**Primary Hemorrhage Following Amygdalotomy.**—An instance of this infrequent occurrence was cited by DR. G. B. HOPE (*New York Medical Journal*, March 3, 1900). The patient was a muscular, married woman, twenty-six years of age, whose tonsils were excised, under chloroform anæsthesia, during an attack of bilateral amygdalitis. The bleeding for the first few moments was extremely brisk, and continued during more than three hours as a free hemorrhage, though occasionally abating slightly. The ordinary hæmostatics were altogether ineffective, and it was only with the persistent employment of the electric cautery that an arrest of the hemorrhage was secured, and while the patient was rapidly becoming exsanguinated.

As suggested by the writer of the paper, it is probable that physiological exhaustion played its own part in arresting the hemorrhage. The hemorrhage was seen to have arisen from an arterial branch on the right side near the anterior portion of the cut surface.

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**Fibrolipoma of the Tonsil.**—This rare neoplasm, reported by DR. THOMAS AMORY DE BLOIS, of Boston (*New York Medical Journal*, October 28, 1899), was the size of a small peanut and hung by rather a thin pedicle, which appeared to grow from a crypt in the left tonsil near the top. It was readily cut off with the incandescent snare. "Microscopical examination shows a section bounded completely, except for one-sixth of its periphery (the pedicle), by dermis. Within is a coarse, irregular network of fibrous tissue, the fibres of which are somewhat separated (œdematous), the network bearing, most deeply in the mass, areas of large fat globules."

[We are not aware of any similar incidents on record, although several such growths have been reported as occurring in other portions of the oropharyngeal cavity.]

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**Spirillum in False Membrane on the Tonsil.**—DR. CHARLES F. CRAIG (*Medical News*, March 10, 1900) makes some observations on spirillum occurring in the false membrane of the tonsil. The case was that of a young man with difficulty in swallowing and soreness of the throat on the right side. He did not have headache, fever, or other constitutional symptoms. An enlarged, slightly reddened tonsil, covered with a thick, dirty white membrane, occupied the posterior portion and extended to the surrounding mucous membrane. It was easily removed and left a smooth and slightly reddened surface beneath. A portion of the membrane submitted to microscopic inspection showed it to be composed of degenerated epithelium, some cocci and bacilli, and an immense proportion of spirilla. These spirilla were large, from 20 to 35$\mu$ in length, but very narrow. They resembled much

the spirilla of relapsing fever in their size and shape, and formed in some places large and entangled masses. The membrane was found to be composed almost entirely of epithelial débris and these bacteria.

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**Rare Ulceration of the Œsophagus in Typhoid Fever.**—Dr. David Riesman reports (*Philadelphia Medical Journal*, September 23, 1899, illustrated) a case of typhoid fever with ulceration of the œsophagus and complicated with croupous pneumonia, in a young farm-hand, seventeen years of age, who had tramped from Baltimore to Philadelphia, where he was arrested as a vagrant and transferred to the Philadelphia Hospital, under the care of Dr. R. G. Curtin. There had been no symptoms during life indicating involvement of the œsophagus, and the discovery of the ulcers was made incidentally during the autopsy. A chain of four ulcers was found on the anterior wall of the œsophagus to the right of the middle line and extending perpendicularly downward to a point 2.5 cm. below the base of the pharynx. With the intervening tissue the four ulcers measured 23 mm. in length. Opposite the ulcers, on the left side, was a prominent gland of lymphoid follicles, and the lymphoid nodules all along the œsophagus were well-marked as small, whitish, non-ulcerated points. The lymphoid follicles on the anterior wall at the base of the pharynx were also prominent. The ventricles of the larynx presented a rough appearance, but were not ulcerated. The faucial and lingual tonsils were enlarged, as was also the middle lobe of the thyroid gland.

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**Anatomy of the Frontal Sinus and the Anterior Ethmoidal Cells.**—Dr. Arthur Hartmann, of Berlin, has been studying this subject, and has made some interesting anatomical preparations to show (*Journal of Laryngology, Rhinology, and Otology*, February, 1900) the methods by which the frontal sinus is developed and the nasal frontal duct constructed. The latter is largely due to the conformation of the anterior ethmoidal cells, which Dr. Hartmann prefers to call frontal cells, and the many variations in the extensions of which give rise to various forms of the duct. He contends that in operating upon this region for obstruction it is not sufficient to remove the floor of the frontal sinus, but that the floor of the frontal cells must also be removed in order to obtain a free communication between the frontal sinus and the nose. For this reason he advises that an opening be made into the frontal sinus and another into the frontal cells through the inner wall of the orbit, and that the walls of the frontal cells be removed with forceps.

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**Spontaneous Retrocession of a Presumptive Malignant Growth of the Larynx.**—Under the head of "Diagnostic Mistake," Sir Felix Semon, of London, reported to the Laryngological Society of that city (*Journal of Laryngology, Rhinology, and Otology*, February, 1900) a case of tumefaction of one side of the larynx, with fixation of the vocal band in the cadaveric position, and enlarged glands below the anterior portion of the sternocleido muscle, in which there was a somewhat indefinite history of a chancre many years before, apparently not followed by secondary symptoms, although it had not been submitted to treatment. Iodide of potassium in 10-grain doses was

given for some three weeks, during which the tumefaction and glandular swellings increased; pain in swallowing had become worse and the voice very harsh. The disease was now deemed to be malignant—an opinion which was entertained by three other physicians also—and an attempt made to perform laryngectomy. Tracheotomy was performed, and a cut joining the tracheotomy incision was made parallel to the border of the lower jaw; but the presence of a number of glands, apparently infected, led to the determination to abandon further operation. To the naked eye the glands appeared epitheliomatous, but no microscopical examination was made. The patient recovered promptly from the operation and returned home a fortnight afterward. Eleven months later the patient reappeared looking very well and saying that he had been gaining flesh and strength. He stated that the glands in the neck had continued to enlarge for a month or two after the operation, but since then had gone down. His voice was still hoarse, but strong. He could breathe without the tube, and the difficulty in swallowing had entirely disappeared. He had been taking a preparation of Chian turpentine.

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**Rhinopharyngeal Vascular Growths.**—The trouble often given by these growths and the success following measures often tedious and impracticable is well exemplified in two cases of large vascular tumors of the nose and pharynx by PROF. M. F. COOMES, of Louisville (Reprint from *Louisville Medical Monthly*). The growths were removed piecemeal; in the first case after a variety of procedures, both through the natural passages and by extensive external operation, having failed on account of profuse hemorrhage. The cold wire snare applied to accessible portions of the tumor from time to time, and left in position from eighty to one hundred and twenty hours before severance, formed a large factor in the treatment.

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## PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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**On the Origin of Simple Cyst of the Ovary.**—v. KAHLDEN (*Ziegler's Beiträge*, 1900, xxvii. 1) presents a very full and elaborate paper on the above subject. The general opinion at the present time in regard to simple cysts (hydrops folliculi) of the ovary is that they are retention cysts originating in the Graafian follicles. Pfannenstiel and Orth, however, think that some of them may be new growths. The theory of their origin from Graafian follicles originated with Rokitansky, who claimed to have found ova in cysts under the size of beans; in the larger cysts they could not be demonstrated.

His observations have been copied in all the text-books and special treatises without further verification. The ova he saw may have come from true Graafian follicles, or they may have been swollen, degenerated cells which resembled ova.

If the simple cysts are retention cysts it is difficult to say why retention occurs. The cysts are very superficial; the albuginea is not thickened; the walls of the cysts are very thin; in typical cases there is no evidence of old adhesions on the surface; true Graafian follicles rupture without trouble beside these cysts. Evidently the etiology is unsatisfactory.

Moved by these facts, v. Kahlden studied cystic ovaries from nineteen cases, varying in age from thirty to ninety-seven years. The ovaries were hardened *in toto*, and many sections made from each. His observations seem to show pretty conclusively that in many, perhaps all cases, these cysts do not arise from the Graafian follicles, but from the germinal epithelium which grows into the ovary in the form of fissures lined with epithelium or of solid masses of epithelial cells; these give rise to glands which develop into cysts. The process has a certain analogy with the embryonic process whereby the germinal epithelium grows in as Pflüger's tubes, to form the follicles.

This view of the origin of the cysts is based on the following reasons:

1. It is possible in a great many cases to demonstrate ingrowths of the germinal epithelium. According to v. Kahlden, in the larger proportion of cases but little gland tissue is formed from these ingrowths, and that develops quickly into cysts. In a smaller proportion of the cases the new formation of epithelium is abundant; it occurs at first in the form of numerous closely adjoined masses of epithelium, which occasionally may resemble carcinoma. Degeneration takes place in these cells, leading early to the formation of cysts.

2. Ova are not present in the cysts even when the cysts are so small that it would be impossible for the ova to have degenerated.

3. Very rarely one of these cysts attempts to produce ova. v. Kahlden reports such a case, similar to one reported by Neumann. In the wall of the cyst were over a thousand ova-like bodies; some of them were very typical in appearance, but they never reach the normal size.

4. The cysts are often present years after the functional activity of the ovary has ceased.

v. Kahlden adopts the term "simple serous cysts," already proposed by Pfannenstiel as the most suitable designation for these cysts, and discusses at considerable length their relation to the other cystic growths of the ovary, to which they must be regarded as related because intermediate forms occur.

[The paper is interesting and exhaustive, but has no summary at the end; is interminable in length, and hammers away at a single line of thought with endless repetition. Condensed into a quarter as much space or even less, and logically, concisely stated, without any wandering from the main subject, it would unquestionably be more widely read and make a stronger impression.—Ed.]

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**Elastic Tissue in Normal and Pathological Organs.**—Melnikow-Raswedenkow (*Ziegler's Beiträge*, 1899, xxvi. 546) considers the organs successively, devoting a section under each to the normal and the pathological

distribution and conditions of the elastic tissue. He does not consider the literature, but attacks the subject as one who is doing a pioneer work, giving a text-book account of the normal and pathological histology of elastic tissue. He has gone over a large amount of material which he enumerates in detail. At the end he gives a systematic summary of the distribution of elastic tissue in the organs, and finally considers the normal and pathological physiology of his subject.

He finds that Weigert's elastic tissue stain gives the best results, excelling even the orcein method.

The bloodvessels are earliest and best supplied with elastic tissue. The vascular system is the earliest to organize and functionate. The elastic tissue aids in the circulation and acts as a support for the muscle fibres. It has a mechanical function in the spleen also; but in the passive organs, such as the liver and pancreas, the amount is small. The bloodvessels and lymph-vessels serve as a source of elastic tissue in all parts of the body.

Elastic tissue appears in an organ before its active function begins. In the new-born the respiratory and circulatory systems are well supplied, but the other organs contain little. In old age, which is associated with physiological atrophy of the organism, it increases with the atrophy of the specific elements of the organs. He believes that here it is a mechanical contrivance to take the place of the decreasing energy of the active tissues and for protection against outside agencies. The arteries afford a good example of this. In the atrophy of parenchymatous organs it is compensatory.

Elastic tissue is very resistant to pathological processes and proliferates readily wherever it may subserve a useful purpose. It is destroyed by acute, especially the purulent, inflammations. It is increased in the vessels and in all the organs by chronic passive congestion. Simple or inflammatory atrophy increases it. He believes that the absence of elastic tissue in tumors partially explains the nutritional disturbances which lead to necrosis. In cirrhosis of the liver there is an increase in elastic tissue only when atrophy begins. In general, elastic tissue acts as a support to the specific elements of the organs.

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**A Case of Hæmochromatosis.**—OPIE (*Journal of Experimental Medicine*, 1899, iv. 279) reports a case which he considers as representative of an intermediate stage between the hæmochromatosis of von Recklinghausen and the bronzed diabetes of Hanot and others. His conclusions are:

1. That there exists a morbid entity, hæmochromatosis, characterized by a wide-spread deposition of an iron-containing pigment in certain cells, and an associated formation of iron-free pigment in a variety of localities in which pigment is found in moderate amount under physiological conditions.

2. With the pigment accumulation there is degeneration and death of the cells, and later an interstitial inflammation, especially of the liver and pancreas, which become the seat of inflammatory changes accompanied by hypertrophy of the organ.

3. When chronic interstitial pancreatitis has reached a certain grade of intensity, diabetes ensues, and is the terminal event in the disease.

The author's case was a man, aged fifty-five years, who came under observation during an attack of typhoid fever. A marked universal bronzing

suggested Addison's disease. Jaundice was not present, and there was no sugar in the urine at any time during the period of observation.

At the autopsy, in addition to the lesions of typhoid fever, there was a marked general pigmentation of the liver, pancreas, heart, stomach, intestines, peritoneum, lymphatic glands, skin, and testicles. There were also cirrhosis of the liver and chronic interstitial pancreatitis.

Histologically this pigment is seen to be in the cells of the parenchyma of the glandular organs, the interstitial tissue, and the endothelial cells of the capillaries. It is in the form of yellowish-brown granules varying in size. These give the microchemical reactions characteristic of iron. There is also less conspicuous variety of pigment in the walls of the arteries. It is in the form of pale yellow granules of almost uniform size. They are in the smooth muscle and connective tissue cells. These granules do not give the microchemical tests of iron, but stain deeply with methylene blue. In the intestine this iron-free pigment predominates, and is chiefly in the vessel walls and the smooth muscle cells.

The important features of hæmochromatosis as described by v. Recklinghausen are:

1. The presence of an iron-containing pigment in the epithelial cells of various glands, especially the liver and pancreas.

2. The presence of an iron-free pigment in the smooth muscle cells of the gastro-intestinal tract and of the blood and lymphvessels, and in certain connective tissue cells.

3. The association of cirrhosis of the liver with the pigmentation.

The so-called "bronzed diabetes" of Hanot is characterized clinically by a rapidly fatal diabetes mellitus associated with cirrhosis of the liver, usually hypertrophic. Bronzing of the skin is not constant, though usually present. At autopsy there have been found deep pigmentation of the liver and pancreas, with cirrhosis, and, when carefully examined, interstitial pancreatitis. An iron-containing pigment is also present in the parenchyma of the liver, pancreas, and other glands, and in certain other parts. The majority of French observers have mentioned only the presence of the iron-containing pigment. Buss, however, reports a case of diabetes with cirrhosis of the liver, interstitial pancreatitis, and general hæmochromatosis. He finds the iron-containing and iron-free pigment in the situations described by v. Recklinghausen. In the author's case there were hæmochromatosis, bronzing of the skin, advanced cirrhosis of the liver, and interstitial pancreatitis, but no diabetes.

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# CONTENTS.

## ORIGINAL COMMUNICATIONS.


PAGE

The Surgical Anatomy of Congenital Dislocation of the Hip-joint. By Edward H. Nichols, M.D., and Edward H. Bradford, M.D. . . . . 629

A Fifth Case of Family Periodic Paralysis. By Leo M. Crafts, B.L., M.D. . . 651

Permanent Non-progressive Ataxia, with a Clinical Report of Three Cases. By Sanger Brown, M.D. . . . . 657

On the Spinal Cord Changes in Paralysis Agitans. By Max Nonne, M.D. . . 665

The Pathological Anatomy of the Cord in Paralysis Agitans and Senility. By Charles A. Dana, M.D. . . . . 667

A Contribution to the Pathology of Chronic Hyperplastic Tuberculosis of the Cæcum, based upon the Study of Two Cases, in One of which Carcinoma of the Cæcum Coexisted. By T. R. Crowder, M.D. . . . . 668

Embryonal Renal Adenosarcoma. By Maximilian Herzog, M.D., and Denslow Lewis, M.D. . . . . 693

A Critical Summary of Recent Literature on Plasma-cells and Mast-cells. By Herbert U. Williams, M.D. . . . . 702


## REVIEWS.


Text-book of the Embryology of Invertebrates. By E. Korschelt and K. Heider 710

Text-book of Embryology for Students of Medicine. By John Clement Heisler, M.D. 710

The Technics of Special Therapy. By F. Gumprecht . . . . . 713

A Manual of Modern Surgery: An Exposition of the Accepted Doctrines and Approved Operative Procedures of the Present Time. For the Use of Students and Practitioners. By John B. Roberts, A.M., M.D. . . . . 714


## PROGRESS OF MEDICAL SCIENCE.

### MEDICINE.


PAGE

The Justus Blood test for Syphilis . 715

Spleno-myelogenous Leukæmia, with Disappearance of the Splenic Tumor 716

Hæmophilia in the Negro . . . 717

Further Observations on Pernicious Anæmia: a Chronic Infectious Disease 718

Case of Multiple Gangrene in Malarial Fever . . . . . 720


### PEDIATRICS.


Fatal Case of Carbolic-acid Poisoning Due to Absorption by the Skin . 721

Lesions of Liver in Young Children . 722

The Treatment of Whooping-cough Without Drugs . . . . 722

A Clinical Study of the Lymphatic Glands in One Hundred Cases of Scarlet Fever . . . . . 723

The Etiology of Chorea . . . . 724

A Case of Tetany of the Bladder . 725

## THERAPEUTICS.


| | PAGE |
|---|---|
| On Belladonna in the Treatment of Broncho-pneumonia in Children | 725 |
| Antistreptococcic Serum in Puerperal Septicæmia and Pelvic Cellulitis | 726 |
| Dry Antitoxin | 726 |
| Aspirin | 727 |
| Action of Certain British and Foreign Mineral Waters on Sodium Biurate | 727 |
| Sodium Sulphocarbolate in the Treatment of Severe Chorea | 727 |
| Guaiacol in the Treatment of Malaria | 728 |
| Xeroform in Military Surgery | 728 |
| The Intravenous Injection of Corrosive Sublimate | 728 |
| Dionin as an Analgesic | 728 |
| Treatment of Erysipelas with Mercurial Ointment | 729 |
| Suprarenal Extract in Diseases of the Eye | 729 |
| Suprarenal Extract in the Treatment of Addison's Disease | 729 |
| Hot-air Treatment of Disease | 730 |
| Liquid Air: Its Application in Medicine and Surgery | 730 |
| Treatment of Leprosy by Injection of Calmette's Antivenomous Serum | 731 |
| Treatment of Diphtheria with Oil of Turpentine | 731 |
| Acoin | 732 |


## GYNECOLOGY.


| | |
|---|---|
| Ileus after Abdominal Section | 732 |
| Dangers of Curettement | 732 |
| Tuberculosis of the Uterus | 733 |
| Dermoid Tumors of the Ovary | 733 |
| Adenomyoma of the Round Ligaments and Posterior Vaginal Wall | 733 |
| Papillary Cystomata of the Ovary | 733 |
| Tumors of the Abdominal Wall | 734 |


## OBSTETRICS.


| | |
|---|---|
| Intra-uterine Amputation in an Upper Extremity by Amniotic Bands | 735 |
| A Case of Superfœtation | 735 |
| Decapitation with Braun's Hook | 735 |
| Treatment of Eclampsia with Saline Infusion | 736 |
| Puerperal Septic Infection | 736 |
| Pyosalpinx; Laparotomy in the Puerperal State | 736 |
| Sudden Death after Labor | 737 |
| Hepatic Toxæmia of Pregnancy | 737 |
| Puerperal Tetanus | 738 |
| Retroflexion of the Pregnant Uterus, with Fistula of the Urachus | 738 |


## OPHTHALMOLOGY.


| | |
|---|---|
| The New Mydriatic, Euphthalmin | 739 |
| Lachrymal Obstruction in the Young | 739 |
| Cure of Pannus by Erysipelas | 740 |
| Tuberculosis of the Conjunctiva | 740 |
| Sympathetic Ophthalmia Treated by Sodium Salicylate | 740 |
| Prolapse of the Iris after Simple Cataract Extraction | 741 |
| Corneal Lesions of Diplo-bacillus Conjunctivitis | 741 |
| Tobacco Amblyopia | 741 |
| Primary Glanders of the Conjunctiva | 741 |


## PATHOLOGY AND BACTERIOLOGY.


| | |
|---|---|
| Investigations on Striated Muscle, with Special Reference to Fatty Infiltration | 742 |
| A New Method of Cultivating the Tubercle Bacillus | 742 |
| Pneumonia in Induration | 743 |